Foundational Analysis in Initiative-Based Change Management Modeling

An Interdisciplinary Study of Organizational Change in the Built Environment

by

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ABSTRACT

Within the vast area of study in Organizational Change lays the industrial application of Change Management, which includes the understanding of both resisters and facilitators to organizational change. This dissertation presents an approach of gauging levels of change as it relates to both external and internal organization factors. The arena of such a test is given through the introduction of the same initiative change model, which attempts to improve transparency and accountability, across six different organizations where the varying results of change are measured. The change model itself consists of an interdisciplinary approach which emphasizes education of advanced organizational measurement techniques as fundamental drivers of converging change. The observations are documented in the real-time observed cased studies of six organizations as they progressed through the change process. This research also introduces a scaled metric for determining preliminary levels of change and endeavors to test both internal and external, or environmental, factors of change. A key contribution to the work is the analysis between both observed and surveyed data where a grounded theory analysis is used to help answer the question of what are factors of change in organizations. This work is considered to be foundational in real-time observational studies but has a promise for future additional contributions which would further elaborate on the phenomenon of prescribed organizational change.

DEDICATION

This work is dedicated to my parents, Marvin, Ireen, Mote and Vicky, my wife Alisi and children; Alma, Kalela, Alia, Alai, Atoa, Tali and Setema. They are the group who endured so much in helping me see the value of education and to reach this level.

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Chapter 1

INTRODUCTION

Change is the only constant. This well-known adage is a telling narrative of the enigmatic yet natural framework of how our human existence identifies and interprets progression. For this purpose, the understanding, manipulating and predicting of change has been an underlying effort of mankind to better gain its bearings in the universe. When addressing the complex and vast subject of understanding the elements of change in human interactions, one finds that the study of such a topic crosses several disciplines in an effort to capture and investigate its occurrence. However, even upon capturing its occurrence, either intuitively or with stronger validation techniques, it becomes increasingly apparent that the study of change leads the student into a multiplex of avenues covering its many sources, results, dimensions, purpose and constancy.

It is common knowledge that change is inevitable. Whether on a personal, familial, group, organizational and even institutional level, change is in constant motion. Specific to an organizational level, this constant change can be classified as being passive, reactive, or proactive. Reactive changes are ones that happen because events happen to an organization. Influences from lawsuits, economic fluctuations, industry strikes or governmental regulation can put leaders on the defensive acting in fear or with high precaution. The responses to such events can be

interpreted to be of the "knee-jerk" kind, and are almost predictable which lead an entity to symbolically "rally the wagons in a circle" for crisis management of a situation. Proactive change, on the other hand, is brought about by an internal drive by visionary leaders to prepare for an event or chart a course that would not have otherwise have been taken without a drive from within. These types of changes can be characteristic of someone steering the group either towards a goal or away from a threat, increasing velocity towards a desired location or putting on the brakes to stop the inertia towards a destination (Simmering, 2010). This research takes a look at some of the elements of this type of proactive change.

Fundamental Questions

In addressing the study of change, an interdisciplinary approach will involve assessments and contributions of perspectives from the fields of education, organizational behavior and performance measurement as they relate to the as-built environment of construction and facilities management. Its effort is to help answer such questions as "how do we learn?" as well as "how do we change?" in proactive initiatives and link the two questions with the concept that learning and change are fundamentally the same thing.

Historically, members from industry and academia have created a union in seeking to understand the fundamental elements that surround change in organizations. Specifically, this research focused on orchestrated shifts in procedures, perceptions, productivity and overall

performance. Two underlying questions that have been asked by the group have been "how can we improve our environment" as well as "how can we make such improvements last?" Additionally, this research has posed additional questions to the study such as "How can the validation of change be made?" as well as "what are different levels of change intensity?" These questions, in turn, lead to the central research question proposed here which asks how applied elements such as education and measurement have influence on human behavior in organized settings.

With this discussion of proactive change it should be addressed as to why an organization would pursue change from its current direction. With such a consideration, questions must be asked surrounding the considered attempt. What is the benefit of first, tying to anticipate the future and second, to plan a course of action based on what may occur? Why change course over the natural flow of things? Does proactive change come at a price? A graphical display of the desired effect, and expected difficulties, of organizational changes is displayed in Figure 1 a display of the purpose of orchestrated change in organizations (Plenert, 1995).

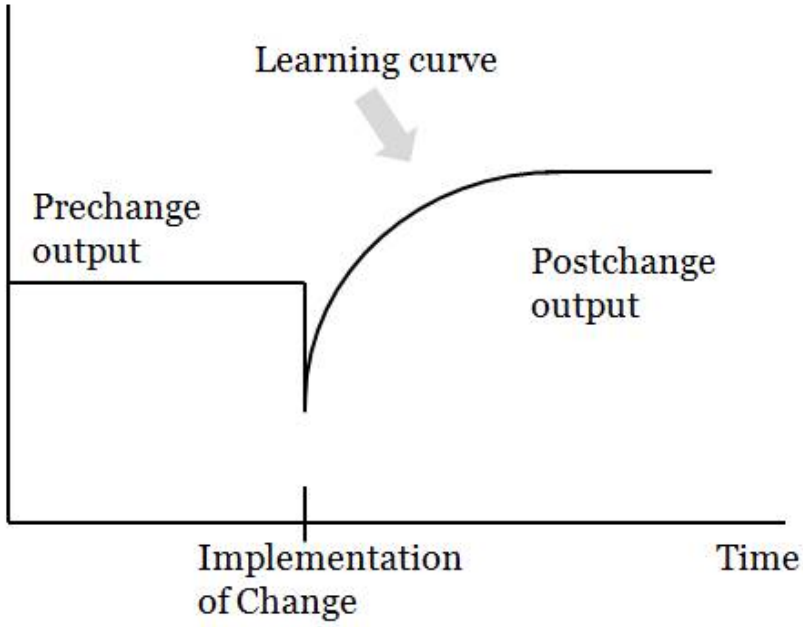


Figure 1: Change Function (Plenert, 1995).

A few important sections of the graph should be noted. First, the desired end result is an improvement in some sort of measurable level of productivity. Second, in order to reach that improved level, an expected drop in productivity is anticipated. Lastly, a specific amount of time is relevant to the observation of change. Therefore, using Plenert's findings, organizational change can be classified as a measurable and distinctive modification of activity or productivity at a group level or single group member that is based off of an intended initiative implemented by supervisory members.

It should also be noted that the use and documentation of organized or managed change is both messy and complex (Ashforth, 2012). Issues to such as, what types of change to attempt to initiate, how to lead the group

through such changes, and how to verify that changes have occurred are a few of the major areas that should be addressed by those in leadership positions over such groups as a starting point.

It is also assumed that change actually begins in an unseen way within individuals of groups through their view of the environment which lead to later changes in behavior or actions. Action changes may involve individual or group acts that signify a difference in how they conduct themselves based on the changes in their perception. Greater complexities of change occur in interactive behavior or discussion where the results of the interplay signify an alteration. Various dimensions of change are also notable in terms of financial levels, numbers of events occurring within a group, time that it takes to enact changes and even the amount of time that a change lasts before natural occurrences push against it.

Though easier to notice in observation, verifying change in natural occurring organizational environments is difficult to stage (Yin, 2008). This is due to the fragile environment of interrelated individuals who must be observed, either historically or in real time, where their acts need to be undefiled by the observation. Because research like this often occurs in industrial locations, the amount of coordination and staging of observation is immense, making it costly on the resources of the research. Other difficulties of documenting such changes arise in finding sufficiently standardized measurements that are compatible with other

academic groups. Without such verification of changes, the information documented will either go on to be misunderstood or ignored.

Even deeper in the complexity of the studies of change, further delineation can be made between measurements of change actions of individuals compared to the measurement of the effects of a change effort. While the latter is a widely studied topic with decades of both theoretical and empirical research, this study attempts to approach the former area by observing and measuring change at its most rudimentary level. That is, as an internal change in perspective expands to singular actions which, in turn lead to more complex actions that would have not occurred had it not been for a driving force of a change effort.

The arena for such a study is given in the current environment of general project management where the individuals involved face similar challenges of creating successful change in the form of project implementation. Such implementation has historically been faced with a series of corresponding problems and overall failure to successfully accomplish the intended goals of the managed shift in output levels of both product and paradigm.

The Project Managers Dilemma: Project crisis and a need for change

Within the profession of project managers, recurring and parallel problems have surfaced across varying industries which demonstrate commonalities in the levels of project crisis and failures (Nitihamyong &

Skibniewski, 2006; Conboy 2010; Nelson 2007; Ivory & Alderman; 2005). Though not standardized by definition, the term failure in projects can range anywhere from performing below expectations in terms of cost, schedule and quality to being completely abandoned or cancelled. Reports over the past decade and a half show varying levels of project failure are more clearly indicated by observing tasks involved and not industry. For example, Information Technology-related failures reported at 18% (Tichy & Bascom, 2008) whereas in the Customer relations Management field of projects, rates have been as high as 60-80% (Kale, 2004; Foss, 2008). By comparison, software projects report an 11-15% cancellation rate (Eman, & Koru, 2008).

Strewn on these paths to failure are parallel histories of escalated attention, diverted resources and unsuccessful attempts to alleviate a growing list of cost, schedule and quality targets that have been missed. (Mahring, & Keil, 2007; Pan, Pan, & Flynn, 2004). Each venture has its own version of failing to meet the expectations of budgets, schedules or overall satisfaction by those involved.

Though many of the projects do not experience full-fledged termination, their tendency to fall short of the expectations is extensive. Technologically-related fields, for example, report this to vary between 40-53% (Eman, & Koru, 2008; Tichy, & Bascom, 2008). However, in a more general industry study of outsourced projects, it is shown that expectations failures are as much as 75% (Bryce, & Useem 1998).

What is also notable is project management's increased tolerance and acceptance of which perform poorly (Paul 2007). This point is illustrated in the construction industry disparities of project failure as outlined by Post. His research shows high perceptions of success rates in construction projects with relatively high rates of dissatisfaction in the management within the project (1998).

Mitigating of Processes: Initiating change in Project Environments

Addressing such widespread problems requires an organized, strategic and measured attempt at modifying fundamental practices and perceptions that surround the project manager's environment. This shift from the existing practices is one that needs to be outlined, designed, and meaningfully recorded in order to help validate if it is successful in helping to alleviate such difficulties in practice. Thomas Monson stated it well when he outlined fundamental elements of improved change in projects when he stated that "When performance is measured, performance improves. When performance is reported, the rate of improvement accelerates" (Monson, 2004, p. 150).

Formalized titles of such orchestrated change efforts can be labeled as interventions, initiatives, facilitations of change or project de-escalation. Such terms are broad and general attempts by management teams and researchers which encompass a full group change effort. (Stanleigh, 2008; Ivory & Alderman, 2005; Kelmen & Warwick, 1978;

Argyris, 1970; Montealegre & Keil, 2000). It is this effort at group behavior modification towards notable improvements in specific areas of productivity that is the desirable solution to the project manager's plight of failing projects and contracts.

It is at this point of initiative implementation in project management environments that this research conducts its observation and testing. The intent is to further the understanding of the preliminary aspects of organized change as well as to shed light on indicators in such settings that help to predict elements of greater and lesser changeability.

Chapter 2

PROBLEM STATEMENT

The problem statement of this research is outlined into four parts which are based both on the situational problem of the initiative process as well as voids that have been identified and outlined in change management literature. The four parts of the problem statement are all related to organizational change (OC) in some form and represent a single void that is to be addressed in the model and hypothesis development of this research. The first part of the problem statement relates to an observation of a practical and applied issue of the author's research group and the other three parts are derived from the literature review of change management topics as they relate to the mitigation of the first.

1. An initiative-based change management facilitating group that helps organizations implement change within themselves faces a challenge of maintaining its clientele through longer terms of sustainable change in the use of advanced measurement systems for periods longer than a year. This is demonstrated in their number of change management projects run, a means of demonstrating their time administering the initiative, with the group where the new concepts and practices are applied in a pilot test and in a subsequent expansion effort (implementation of organizational change). As shown in figure 2, there are extreme levels of discontinuance between the first "test" project, known as the pilot,

and fifth, where there is an expansion effort, leaving only a 16% sustainable change rate of clients. Following that point, the curve begins to level out to 5% by the 50th effort to implement the change on a specific project and 3% by 100. Though retained change rate of 3% is both notable and applauded, the trend in historical tracking of the success of retained subjects explicitly shows the need for improved understanding of the dynamics of successful change as well as the possible reasons for the inability to do so.

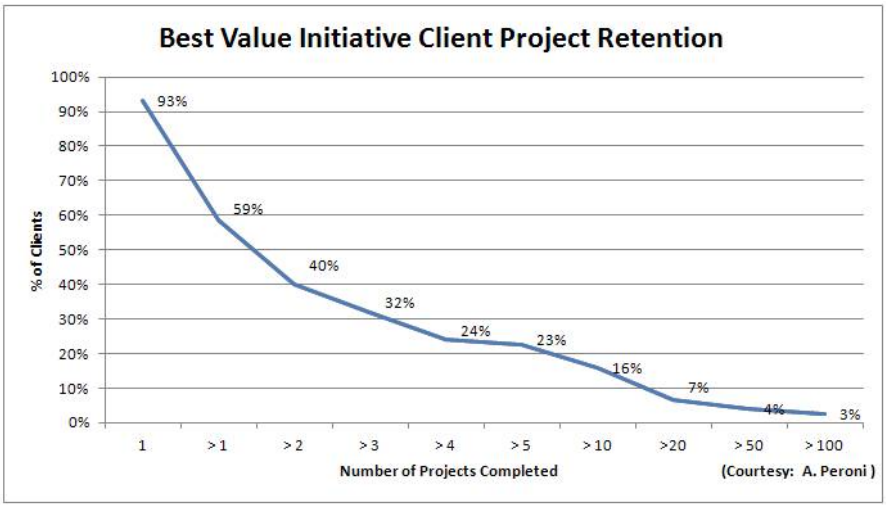


Figure 2: Retention Levels of Change in Best Value Initiatives

2. The second problem stems from the initial problem. This is that as one seeks to better understand the researched processes of change management via initiatives and other interventions, one finds that the field of research produces only a narrow niche of case studied examples. From the existing encountered research there are close to a dozen well referenced models or approaches to change which,

though promoted as possible outlets for success in application, have verifiable weaknesses in their tested validity (Sullivan and Lines, 2011). Only 27% of the models analyzed had research case studies where actual events were tested against the proposed sequence and results. This parallels the low levels of case study research found in the construction industry (Sullivan, Kashiwagi & Carey 2008; Sullivan, Kashiwagi & Lines, 2011).

Empirical research as titled by research teams referred to data heavily fortified with personal experience of the researcher and in smaller amounts by the case study data provided.

Research observations are conducted off of historical data that is not in any real-time observation which can allow for greater loss of clarity in perception of events as well as lower strength in accuracy of test application. Because of this observation, the model application point (MOP) is classified as historical (HMOP).

It is therefore likely to denote that any attempts to apply such models would have an unpredictable success level due to the fact that current suggested models are lacking in producing an actual test, let alone a replicable one in a scientifically observed test.

3. Further assessment of the observed models brings a deeper-level understanding of potential voids in the methodological analysis in

that standardized measurement of observed change is neither applied nor promoted. This is demonstrated in that actual measurement of such models is anywhere between rare and nonexistent. Deeper analysis of this issue shows that no sustained standards are proposed or maintained. This is demonstrated in the fact that only 36% of the models carried out any type of long term measurement (Sullivan and Lines 2011).

4. Within the confines of measurement of observed change, the one area that does endeavor to quantifiably verify such modifications of behavior deals with transformational learning which, in many OC circles is believed to equate to change (Bennis, 2000: Senge, 1990; Wheatley, 2000). Though large in its field of research, validation techniques are considered complete when the singular perceptual outlook of an individual or group is achieved. Though this can be accounted for as a simplistic version of organizational change, it is difficult to measure and cannot be classified as physically observable action (Taylor, 1997). Therefore, a vast majority of observable change, varying from a subject's simple actions to complex interactions and beyond, are deemed as un-documented.

A summary of the problem statement can be defined in a cyclical pattern of having a need for changes in organizations but a lack of tested standards or steps which can be implemented that are based off of a

replicable model. Such a scenario leads to a void in empirical measurements of what can be defined as a pattern of change within individuals and organizations.

Research Objectives

It is from the problem statement that several objectives are derived to address particular voids in the current environment of applied and theoretical discussion of OC. These are listed below:

- Create a method of testing organizational change questions that engender an interdisciplinary approach of change in organizations drawing from the fields of organizational behavior, education and the built environment. This approach attempts to enact OC through specific and constant education of advanced measurement practices. Validating support of the model's effectiveness will be carried out through the measurement of results in a theory-based framework.
- Develop a new understanding and methodology for testing an organizational change model that is initiated at the beginning of the observation period as compared to the methods of the past literature, which draw their empirical data from historical investigation and piecemeal experience of research experts.
- Create and apply a series of hypothesis tests that will consider empirical data through six case studies involving project managers

in varied industries where live events will be documented, assessed and assimilated into a process model of change. These six groups will consist of organizations who have agreed to test an initiative of increasing performance within the observed groups through the education of advanced measurement in their environments.

- Apply a specific process model of change that encompasses education and measurement as key as drivers of change. Though this model is not the focal point of such a study, it is an fundamental tool used in the further understanding of the change pattern that takes place.

- Initiate an observed study that verifies and documents the action changes that are proposed to follow transformation learning. That is, the physically observable changes that follow what is called a change in perception.

- Draw data from the six case studies as they conduct the change initiative of applying advanced measurement techniques in multiple levels of project management within various relationships of supervisors, (or supervising parties), and subordinates, (or subordinating parties).

- Develop and introduce a scaled metric of varied levels of observed acts of change that can be documented, compiled, and analyzed based off of the observation of the six cases. These observed acts

will serve as part of the data that is accounted as measurements for the research effort.

- Measurements used in the test will be developed specifically in a manner that they can be held constant and standardized throughout the observation period of each case study. With this constancy, greater levels of observation and validation will be accomplished with will further the understanding of change in organizations.

- Provide analysis and conclusions with the above prerequisite framework that provides improved perspectives in understanding of the change patterns that occurs in organizations as they progress through the project management initiatives of applying greater uses of environmental organizational measurement.

Chapter 3

LITERATURE REVIEW

I. HISTORICAL CHANGE EFFORTS: A CENTURY OF PROJECT DELIVERY OPTIMIZATION

In the study of organizational change theory, there are several worldwide contributors who have laid the groundwork in both theoretical construct and applied hypothetical testing. However, for the sake of this review, the author has elected to focus on the work of those who have affected perspectives received by the United States over the past century to reflect both progressive and post-progressive era environments. These pioneers in research have come from a mix of industrial and academic backgrounds working to understand the ins and outs of group change in varied arenas. A historical overview of major contributors is given below with their relevant contributions outlined.

Progressive Era and the Early Contributors

For the purpose of this dissertation, the author has chosen to begin the analytical research of intentional change at the organizational level to the beginnings of the 20th century. The period of the early 1900's marks a unique time in history known as the progressive era where the general public in the United States was seeking dramatic changes in business practices, government conduct and voting suffrage for women (Buenker, Burnham & Crunden, 1977). A specific and powerful example of

progressive reforms is displayed in the journalistic efforts of the "muckrakers" who sounded the alarm of corruption and scandal in both industry and politics, great changes were forced due to public outcry on existing practices (McGerr, 2003).

Organizational change studies begins to come forward as the industrial revolution blended with early researchers in academia and forming a symbiotic relationship which allowed for the observation and analysis of human groups in the working class.

As early as the 1919, the well documented contributions of Henry Gantt, an American mechanical engineer turned industrial project manager, introduced a new process of scheduling general construction widely used even today called the Gantt chart. In his book on the subject, he emphasizes "a parting of ways" with the contemporary, yet less efficient, industrial revolution methods of conducting business and an embracing of methods that he had shown to be more optimal in the management of projects (Gantt 1919). Though his work is known for its simplicity and perpetuation through the decades, it is his call for organizational change in the existing techniques of project management by groups that is to be noted here.

It was also during this time that the term and process of "scientific management" was made popular by Fredrick Taylor, a mechanical engineer by trade who became a management consultant and scholar. He

sought to apply scientific observation and optimization of labor movements at the worksite to achieve greater efficiency and productivity. However, it was the documentation and formulation of a general model for labor improvements that makes his work relevant to this review. His four steps (outlined below) can be deemed as one of the first organizational change models for improvement to be used across hundreds of trades within companies as well as over dozens of varied yet unrelated industries. These steps are as follows:

1. They develop a science for each element of a man's work, which replaces the old rule-of" thumb method.
2. They scientifically select and then train, teach, and develop the workman, whereas in the past he chose his own work and trained himself as best he could.
3. They heartily cooperate with the men so as to insure all of the work being done in accordance with the principles of the science which has been developed.
4. There is an almost equal division of the work and the responsibility between the management and the workmen. The management takes over all work for which they are better fitted than the workmen, while in the past almost all of the work and the greater part of the responsibility were thrown upon the men (Taylor, 1912).

Taylor claimed to have over 50,000 laborers trained under this methodology (1912), an unprecedented feat by someone considering that

he was not directly over them and could not therefore mandate the process.

Along with Gantt's contribution in construction management, Hugo Munsterberg, an early pioneer of applied psychology, conducted several studies on human behavior in industry-specific fields such as filmmaking, judicial court jury groups and business organizations. From this early research appeared the movement of applied psychology where academics in the fields of psychology began using their findings and knowledge to the betterment of all industry efforts (Viteles, 1932).

Being a key initiator to applied psychology, It is the groundbreaking work of applying centralized human behavior theories to various unrelated industries that makes Munsterberg's work most worth noting. He was one of the premier individuals who demonstrated that human behavioral problems are not unique to a single industry nor are they greatly varied from jurist or a filmmaker or other industrial groups. The key pattern that he introduced is that differing groups have similar issues to grapple with because they all have humanistic characteristics at their core.

It is from Munsterberg's type of work that modern academia has drawn its inductive pattern of development of theories based on observations of varied segments both within and across industrial partitions in order to define and predict human nature.

As he linked similar behaviors from various industries, he concluded that "the engineer must recognize…the mind of the working

man…The lawyer must…understand the minds of the defendant and the plaintiff, the witness and the jury…The teacher…the mind of the pupils" (Munsterbeg, 1914, p. 5).

The Hawthorne Tests

A final cornerstone of research from the early 1900's brings us to what is likely to be the most encompassing and intriguing research effort from that era from its comprehensiveness in array of observational, longitudinal period in testing as well as its ability to scientifically show easily measured results, in the form of output of products, from each test. This research commonly referred to as the Hawthorne Experiments, have been so impactful on modern day organizational change theory that it is one of the most revisited experiments in the study of organizational behavior.

Between the years of 1924 - 1932 a group of business operations managers in Cicero, Illinois received permission and resources from the national research council to conduct a series of experiments in their production plant to try to boost the productivity of their employee teams in making telephone-related products. In each of the most notable experiments, they would adjust some predetermined environmental variable, such as the brightness of lighting, room temperature, break schedules or break durations, and track the level of units that were produced. The initial results of the experiments proved to be helpful in that it showed that sometimes there was a relationship between

environmental inputs in the workplace. The research showed that levels of productivity seem to regularly rise in each case until the termination of the study module where productivity peaked and then returned back to normal pre-study levels in the days and weeks that followed (Mayo, 1949).

For the sake of this analysis on metrics, the author would like to summarize the Hawthorne model method into 4 key steps that were carried out in some form or another during most of the study. These are listed below:

1. Educate group about the intent (adjusting environment to see if it helps productivity).
2. Implement new practices (adjustments in lighting, break time etc).
3. Measure Results in terms of productivity (tracking the productivity in units).
4. Display and Compare results to base-lined amounts (Tracking improvement).

Planned Change: Lewin's Impact

It wasn't until 1947 that one of the largest and farthest reaching model developments in the century took place in the understanding of organizational change with the release of Kurt Lewin's working method on change. Based on his studies with consumer purchasing habits during World War 2, Lewin was able to formulate a flowing model on the process

for change which acknowledged the difficulty in both initiating maintaining change. The model's 3 steps of change included an unfreeze stage, change stage and a re-freeze stage in a cyclical sequence based on the number of change initiates applied (Burnes, 2004). Each step had key purposes as interpreted below:

Unfreezing - Lewin stressed the importance of a systematic purging of old patterns in behavior in order to remove restricting prejudices to the newly desired practices. The steps purpose is "to break open the shell of complacency and self-righteousness" as it currently exists and create an intended "emotional stir up (1947, p. 229).

Moving - This stage includes the modification of patterns and paths in order to allow for new methods to take hold. An important aspect of this step is the cycle of trial and error in making adjustments. As Burnes iterates, it is a pattern of "research, action and more research which enables groups and individuals to move from a less acceptable to a more acceptable set of behaviors" (2004).

Refreezing - Involved the stabilizing and cementing of newly derived practices in order for them to take hold in a sustainable manner. This step requires the integration of the new patterns into the organizational culture in such a way that it is safe from regressing back to the old.

This pioneering model was novel and groundbreaking for the following reasons.

It addressed an initial organizational jolt or destabilizing interruption to the current equilibrium in order to transact change.

1. It also addressed the importance of holding new patterns long enough to avoid defaulting back to old patterns.
2. It was based on empirical observations of human behavior.
3. It acknowledged and addressed the difficulty in both initiating and maintaining change organizationally.
4. It included a systematic methodology of processes that could be tested by other researchers in varied environments.

For close to 40 years, Lewin's model of "Planned change" enjoyed nearly undisputed eminence in research and application groups until more modern approaches to change crept up to take precedence over his work (Burnes, 2004). Even today, the process of preparing for change environmentally and the post-maintenance of such changes is commonly practiced.

During this period of orchestrated change theory, two key contributions into the research field are worth noting regarding change. Kelman and Warwick addressed the ethical morals behind various types of planned changes, or what was referred to as "intervention", as they brought to light terms of coercion and manipulation contrasted with their counterparts of persuasion and facilitation in the change process (1978).

Because such attempts were decisions and schemes of management, their intentions and methods were called into question on an ethical scale.

Further notable development in the unfreezing stage environment is accounted for by Schein as he outlined the three factors. They involve the education of inaccuracies of the status quo organizational patterns, the installation of guilt or survival stress, and creating an assurance of mental safety (1996). It is this delicate mix of agitation, tension and trust that is also considered in the management of change.

Building on the issues of ethics on OC, Agryris emphasized less coercive methods of creating change by giving the valid usable information to facilitate choice which should lead to greater responsibility for decisions. This concept on directing change was created on the underlying assumption that responsibility leads to commitment (Argyris, 1970).

Transformation & Effectiveness: New Perspectives of Change

With increased technologies and international competing forces of the 1970's - 80's, a newer generation of scholars and managers began to address the fact that real life organizational experiences were becoming more complex and that the cycles of change were continuously occurring at a faster rate. The term "transformational" initially was introduced by Burnes as a leadership style which instigated change that was not only more efficient in its utilization of resources between leaders and subordinates but that it also equated to results that were greater than the sum of the individuals within that leader-follower group involved (1978).

Identifying transformation and change in the same areas began to catch hold amongst researchers and took on gradual spread starting in the early 1980's.

Tichy & Ulrich lifted this transformational philosophy and blended leadership principals with change on the organizational level in their more in depth perspective of the transformational leading model. This model consisted of an effective leader's role in the three progressive stages of developing a vision, mobilizing the group towards the vision and lastly, institutionalizing the group towards maintenance of the newly implemented vision. Though this resembles Lewin's older model for planned change, it emphasizes the leadership role in the process which led to such terms as transformational learning, transformational change and transformational leadership (1984).

One highly impactful, yet subtle example of blending organizational transformation with greater emphasis on leadership is with the works of Edwards Deming. The repercussions of his work with Japan coupled with the dire need that American industry faced in the improvement of its delivery of goods and services proved to be very timely in the progression of organizational change theory and practice (Deming, 1982).

It was during the first two decades of Lewin's eminence in planned change philosophy that the United States also enjoyed economic supremacy and dominance in several industries. It wasn't until Japan, an unlikely competitor, crept up and began to take away the economic market

share in automotive industries that the general public began to take notice in the 1970's. This progressive change in industry hands came to a point in the early 1980's, following the fuel shortage, Japan's investment into more fuel efficient cars left the U.S. companies behind in economical and quality cars. This period was accented by Deming's release of his seminal book "Out of Crisis" in which he outlined the problems of American industry in general and the reasons why the Japan had surpassed them in both quality and cost competitiveness.

Though his book had huge popularity amongst industrialists, theorists and the entrepreneurial minded , it was his approach to the change that was needed in the U.S. industry that gives accurate impact to a new trend in change management that needed to be understood. After being hounded by droves of followers in the industry for consultations to "fix" their organizational problems, he noted that these seekers of education were being "misled into the supposition that it is all very simple for American industry to copy the Japanese" more efficient style of management (p. 126). "Management must go through new learning", he states, and adds that "Drastic changes are required [where] the first step in transformation is to learn how to change." He also emphasizes that "Long term commitment to new learning and new philosophy is required of any management that seeks transformation" (p. 126).

Tying in with previous views on organizational change which called for the process of making singular changes in organizational form or

direction, transformational change required a much larger investment in scope, resources and longevity. In light of Deming's proposed alterations in leadership, the Japanese managers who understood the process and journey to reach it knew that it actually took decades to have employees efficiently create and run such technical delivery systems as Kan Ban, and Kaizen. They scoffed at their American counterparts attempts to implement such systems as they put 1 and 2 year schedules for full implementation (Plenert, 1995).

Deming thus shows that the process of changing from the current traditional styles of management towards what the Japanese auto industry was practicing was not simply a start to finish type of experience as Lewin had proposed. It would require up to decades to achieve, demand a high level of management effort and support as well as a much longer commitment period that what may have been normally expected in the existing culture.

To summarize the issue he also iterates that nothing less than a full transformation of the American style of management will be necessary to improve the country's chance at recovering lost ground in industry (Deming, 1982). Along with this he titles his key points for change as the "14 principles for transformation". This very choice of words begins to show up in organizational change literature, as will be shown, as a more effective and potent description that the more traditional "planned change" model.

As Deming's principles of change spread throughout circles in both industry and academia, another similar understanding was gaining ground pertaining to the level of commitment that was realistically required for true organizational change. The term Organizational Effectiveness was being brought up as a factor worth of further research in assessing environmental readiness or health of a group in the midst of organizational changes. Another approach to understanding such effectiveness addressed factors within a group such as communication strength, internal flexibility, commitment to internal goals, supportive climate and continuous ability to adjust course along the way. The key difference in this theoretical approach is that it does not concentrate on the exterior forces in trying to exercise change but rather emphasizes the internal environmental status as a means for predicting changeability (Kreitner, & Kinicki, 2008; Barthelemy, 2001; Schein, 1996).

Organizational Development (OD): Longitudinal progression in Change Theory

As several of these theories continued to build on each other and grow in number, it began to become apparent that a more long-term sequential, and even strategic, approach was needed in order to create an impetus within organizational progress (Pettigrew, 1990). For all of the work and planning that took place for a single change to be transacted, it made greater sense that if momentum could be created towards continual organizational changeability, it would be much to the benefit of leaders to

push for more fluid initiatives that aimed towards strategic, long term and large scale targets. Additionally, the role of leadership could gravitate more towards vision and planning and away from pushing and enforcing the achievement of desired changes. This research drew upon the earlier writings of Beckhard who introduced the concept of organizational development as containing the following criteria are:

1. planned
2. organization-wide
3. managed by upper level top supervisors
4. Aimed to increase organization effectiveness and health through planned intervention in the organization's "process," using behavioral-science application (1969).

This emerging understanding included ongoing commitments towards training and education, coaching, confrontation meetings, and data feedback cycles where change is accomplished through an emerging approach which considered organizational ground rules which were intended to be of longer term and larger scale (Schmuck & Miles, 1977).

The Leadership Role in Change Management: Creating Environments of Change

As organizational change studies gradually grew into the longitudinally observed environmental factors that contribute to change, other tested aspects of successful change advanced which are worth

noting. While keeping on the theme of following parallels, the author also wishes to include other aspects of organizational change that have proven to be beneficial in successful changing groups. In the mid 1990's, Rolls a carried out a key study on the relationship between organizational change and leadership and where it was found that there was an exclusive relationship between leadership, learning and change. (1995).

It was this study that helped in two key areas of furthering the understanding of OC. First, it brought to light the equation where learning with change are conceptually the same and secondly, it demonstrated a notable relationship between leadership and an organizations ability to adapt to changes. Leaders and supervisors were to be further understood as facilitators of change in organizations. The relationship between supervisors and subordinates became a point of observation in the organizations ability to navigate change and the ability of supervisory groups to create specific environments that aided or hurt the cause.

By adding the leadership role into the formula towards successful OC and OD implementation, several studies were spawned trying to further clarify the influences of leadership in change and development efforts. These studies illustrated that there were environmental results that were generated by the behavior of supervising parties that had an effect on progressive interventions and that specific types of leaders both promoted and facilitated successful change.

What is cited to be one of the most influential and important factors necessary in organizations that promoted successful change was that of trust. This trust level is that is needed not only between subordinates and managers but within the organization as a whole (Taylor, 2000). Organizationally, trust often is described with relative terms as "enabled" or "empowered" where leaders maintain a consistent level of supported accountability to those that they oversee. Though more difficult to measure, the perception of trust by subordinates is a well supported means to enabling change (Bass 1994, Deming E. 1982, Kouzes & Posner 2007, Mezirow 2000).

A second key aspect of creating an environment of change lies in the organizations commitment and involvement in continual learning. Kouzes & Posner iterate that effective leaders tend to be continually participating in learning experiences (1995). This emphasis on learning lies not only at the top levels of management but at all levels in order to form an environment of learning (Brown & Posner, 2001). It may even be an effective gauge of leaders of the future to see how well they can instill a culture of learning within the organizations that they oversee to make it more fluid and changeable (Conger & Benjamin, 1999).

Minimal Rules Leadership (MRL): Facilitator of OC

Environmental factors of change have also been observed from more applied case study sources as developed and proposed by industry leaders. In practice, this atmospheric fluidity of change would blend facets

of trust, empowerment and learning to create a setting where there was more of a flux of change as compared to the frozen and unfrozen states of systems. Thus, change is enacted by creating an environment that is conducive to facilitating it.

Such was the case of the philosophy of minimizing rules in organizations so that change is facilitated and subordinates are empowered with the ability to make such changes on the fly. This concept, as outlined by its proponents, is one that is packaged as a leadership style that is sustained by the supervising party.

The study of minimal rules as a leadership practice was inspired by and promoted by of Dr. Bill Badger and Dr. Dean Kashiwagi from the Arizona State University. Its principles were initially tested by Badger during his career as an army Colonel and further tested during his time as a Department Chair at ASU. He even overemphasized its value by stating that "Badger Rule #1" was that there were "no rules" (2009). Though only stated as an exaggeration, he proposed that it was a philosophy used to fight the hierarchy and bureaucracy of the military which he dubbed his "Anti-Micromanagement Philosophy" (Badger, 2009). In both of his careers the existence of rules (both written and unwritten) with pressure to obey them was paramount. The over emphasis on rules and their enforcement in the military demonstrated to Badger an observable definite decline in creativity, innovation, ambition and drive. He also noted that there was little trust when rule levels were very high. After years of

fighting the hierarchy of the military he came up with a leadership style which minimized the crippling forces of too many rules.

By applying the study into the workplace setting, it allows for the research to draw on other related facets such as leadership, motivation, and productivity that have been tested and documented in other academic approaches. It also allows for case studies to be made with organizations that practice such principles.

Rules can be defined in various ways, yet for the sake of this review, it will be narrowed to a organizational and institutional level. By definition, they are considered Institutional norms, practices, regulations, street-smart knowledge, codes of conduct or technical specifications (Sloane, 2009). They can be as small as the fine print in a contract agreement and as large as a billboard sign along a freeway. Often times they are unwritten and even unspoken although understood by the masses. If you've ever been told "if you know what's good for you, you should do this...or never do this..." then you have likely heard an unwritten rule. Rules are established to create a general understanding of practices or guidelines. They are barriers to help us focus on tasks and move in a direction as a group. Rules encourage conformity and a type of order which can be desirable. They help us stay a course, complete a task with uniformity within specified tolerances of productivity.

Being barriers, rules are typically neutral and objective. Regardless of whether they are deliberately placed or not they do encourage specific

behavior or patterns in people. Like blinders on a horse, they encourage greater focus and keep us from being distracted by surrounding scenery. However, the blinding characteristic of rules also has a downside which can be even more detrimental if allowed to get out of hand.

Rules are not laws and must be distinguished from them for the sake of safety. They have their boundaries both geographically or organizationally whereas laws supersede those boundaries and are more universally transcending and long lasting as illustrated below in figure 3.

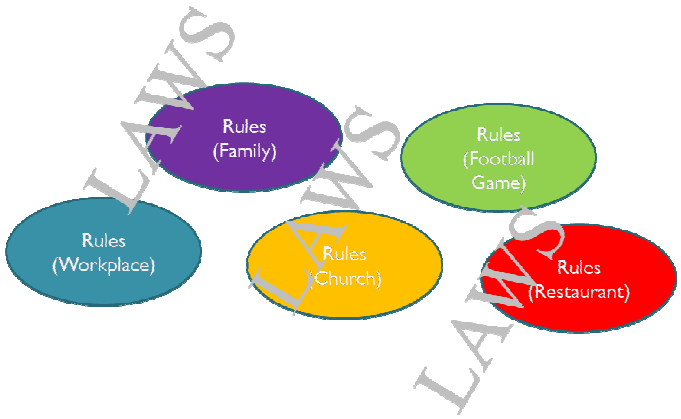


Figure 3: Rules vs. Laws Relationship (Badger, 2011)

It also means that rules are not set in stone (Wikipedia, 2009). "Rule Simplicity" is another single word that helps to describe the minimized environment. What supervising groups are telling subordinates when they reduce and simplify rules is "I will not micromanage you", or "I won't try to manipulate or change you". For subordinates it pushes them to make their own work rules to live by and to

align themselves according to their passion and capabilities in work (Kashiwagi, 2008; Bennis, 2000).

Additionally, Badger observed that rules in an environment naturally increased in number over time. With most new change initiatives, leadership campaigns, or software implementation comes a new set or layer of rules. Yet, the old paradigms and manuals are not ushered out so clearly and easily. Therefore, a gradual increase in rules takes place (2011).

It is assumed that this is from individuals trying to control others via rules and that fact that rules are often ushered in with great attention and removed quietly. Implementing a minimal rules (MR) environment runs counter to the natural tendency of rules and so it also counters some of human natures demand for control.

Minimal Rules Leadership (MRL) Cases

With any management style that is to be considered, a key question to be asked is that of the measurable benefits. In light of the OC perspective, the question must be considered of what are the effects of MR towards directed change? What is to be hoped for or expected by leaders who promote a MR environment?

In answer to the question, Badger theorizes that MR Leadership is one method of fluidizing the solid set of restraints which allows for change in any social environment. This change can be either desirable or undesirable depending on the type of people involved. If they are

proactive and self actualized, changes could be desirable (2011). Examples of MR environments are given in a three diverse group settings. These organizations varied in their purposes but had a shared common goal of minimizing rules towards productive goals.

Case 1 - SEMCO: The Anti-Rules Company

SEMCO is a well known Brazilian company that has exercised the rule minimization philosophy with well documented results. The company specialized in industrial tools such as shipyard water pumps, large scale paint mixers and commercial dishwashers. SEMCO was run with very traditional top-down rigid management with many rules. However, upon taking the helm of the company from his father in the 1980's it was faced with several catastrophic events such as national economic collapse, hyperinflation, strikes and hostile labor union relations. All of this was on top of the normal day-to-day issues of corporate survival.

After trying every traditional remedy that he was taught in his business training and still failing, he started testing some unconventional systems of simplifying his workplace; namely, systematically removing aspects around the workforce that represented rules. Semler states his realization and premise for taking such drastic changes in that

Speaking on rules, Semler felt that they were a distraction away from organizational objectives and provided a false senses of security (Semler, 1993).

First he attacked the rule laden process of keeping excessive corporate records. He started by throwing out old files and file cabinets having employees ask the question "what's the worst thing that can happen if we don't have this document" before tossing it into the garbage. Following this policy change, there came the elimination of instruction and procedure manuals that were created by the company. They were replaced with the council to "use common sense" in carrying out business. This void of instruction manuals started the employees thinking more about what they were doing and why. It also allowed them to use more common sense thinking and even have more accountability in their decisions. Interestingly, the employees liked the changes. They felt liberated from being tied down to the non-value added activities such as filing documents and following outdated and incorrect procedures on outdated manuals. Management, however, struggled with the changes (Semler, 1993).

After seeing sufficient success with the system changes and carried in further by eliminating dress codes rules, assigning secretaries (having executives do their own clerical work), and letting employees decide on their work schedule. One of his ultimate goals in this system of minimal rules was to continue pushing the decision making as far down the hierarchy as possible which would then free up management resources and give employees better pride in their work. Coupled with this empowerment of subordinates, he would intentionally manage less and

even not be around during key decision making periods in order to program his supervisors to think for themselves and make decisions on their own (Semler, 1993).

One of the most noted and controversial changes that he made was to eliminate the rules of secrecy about payroll amounts by allowing all to see how much salary everyone was making. This change was coupled with the opportunity that employees could not only pick their own salaries but also vote on who should stay in the company and who should go based on their pay.

The end result was one where, in Semler's words, the "bananas ate the monkeys" and the employees took responsible charge for the company's welfare which in turn freed up managers time. Semler notes that the subordinates loved the new direction but a part of the management loathed it. With this empowerment can financial growth as well. SEMCO was a company grossing around $4 million in the early 1980's to over $212 million in 2003 with worldwide attention and demand for his model based on empowerment, trust and thinking/learning organizations (Semler, 2003).

Case 2 - Skunk Works: Over 50 Years of MR Simplicity

Within the California based aeronautical company, Lockheed Martin, is an internal group which has attracted a lot of attention for what aircraft it produced as well as the organizational method that they worked under. This notoriety has lasted from its origins during World War 2 until

today. This group, officially called the Lockheed Advanced Development Projects, is more commonly known as the “Skunk Works”. Originally named after a comic strip during the 1940's, this sub-organization has become known for it’s highly fluid, non-bureaucratic and autonomous characteristics. Some of the most well known planes that Skunk Works produced were the P-38, P-80, SR-71, U2 and the F117 nighthawk.

Comprised of about 200 engineers, skunk works was able to produce these aircraft with lower budgets and quicker delivery times because of the minimal rules philosophy that they perpetuated. A mere 14 listed rules of conduct is what they adhered to by for over 50 years without any major changes. To illustrate how phenomenal this simplification of rules is, a summary of the complex technologically engineered breakthrough is listed below:

- Complete redesign of a fighter aircraft body style P-38
- First 400 mph plane (P-38)
- Design and building of the first U.S. mass-produced Jet engine aircraft (P-80)
- Design and building one of the fastest craft ever built (SR-71)
- Popularly known spy plane (U2)
- Stealth body technology on aircraft (F117 Nighthawk)

What made these 14 rules truly unique was the way that they were constructed. Unlike the restrictive controlling nature of more traditional

workplace rules of their time, Skunk works made few rules with the expressed intent of promote efficient processes, common sense thinking and even rule breaking when it was necessary (Miller, 1995).

An analysis of some of the relevant rules is made below in order to illustrate the MRL simplification concepts in Table 1.

RULE KEY WORDS	**ILLUSTRATED (MR) POINTS**
Rule #4. "...simple drawing and...great flexibility..."	Simplicity and changeability was a key aspect design and development. Avoiding complexity and rigidness and being open to new ideas.
Rule #5. "...minimum...reports..."	Any unnecessary type of report is an excessive rule and was eliminated.
Rule #7 & 9 "The contractor must be delegated...responsibility..." "The contractor must be delegated ...authority..."	Only two rules demanded delegation of authority and responsibility. The emphasis specifically delineates that Delegation is important *and* responsibility spread out.
Rule #12. "...must be mutual trust..."	To demand and promote trust is to ask workers to be win-win people, a basic tenet of MR Leadership.
Rule #14. "...reward good performance...not based on the number of personnel supervised." (Miller 1995)	This rule sums up the rewards process by promoting performance with the number of personnel supervised being the denominator or detriment. What it really promotes is efficient leadership where the people below you do more with less oversight and management inspection.

Table 1: MR illustrated in the writing of the 14 rules of Skunk works

A key aspect of MR that plays into existing organizations is the promotion of freedom and common sense thinking that empowers employees to skip over traditional tedious, unnecessary and time consuming practices towards efficiency. For some, this comes intuitively and others require training and guidelines on when it is necessary (Badger 2011). In Miller's historical review on Skunk Works, he outlines a set of recurring themes that hovered around their 14 rules. These guided employees on when and how to leapfrog current practices or rules in the company. In essence, they are a guide on when to minimize or eliminate rules. This is not unlike what Wikipedia, the eminent on-line encyclopedia of today, promotes today in their own set of policies. "If a rule prevents you from making improving or maintaining Wikipedia, ignore it" (Wikipedia, 2009).

The following in Table 2 are three of these guides that Skunk works lived by (Miller, 216).

Rule-Bypass Wording	**MRL APPLICATION**
1. **Timeliness**: "Everything possible to save time"	If the rule that you are following is stopping or slowing you down from your environmental goals, change things up to speed it up the process.
2. **Passing Information**: "Information ...passed ...most direct and simplest manner."	Like timeliness, the above phrase implies that information, (especially critical information), has a tendency to move too slowly to where it needs to go to be utilized. The suggestion is of the phrase is to do all you can to make the transfer of information as quick and simple as possible.
3. **Purchasing**: "...without the red-tape...-- get the stuff."	Again, the unwritten message here is that there are too many restrictors (rules) which make the process of purchasing, invoicing, receiving, storing and finding materials slow, confusing and inefficient. Skip the rules that hedge up and cloud the process and you have a quicker moving system.

Table 2: MR specifics in the rules analysis

When deciding to skip or ignore rules there needs to be good reason to do so (i.e.: efficiency, common sense, innovation) but these decisions must be made in awareness of laws and made at the lowest hierarchical level possible. Consequences of ignoring rules are kept within the boundaries of an environment where the set of rules exist. However, ignoring laws, which transcend such arenas, can bring litigation, physical danger or even death. Therefore, candidates for a MR workplace must have the capability, judgment and sensible ethics to distinguish between the two as outlined in figure 1 shown earlier.

Case 3 - Performance Based Studies Research Group

A final case study of rules comes from the introduction and formulation of the Performance Based Studies Research Group at Arizona State University. Badger applied the "no rules" philosophy in his work with a Ph D student, Dean Kashiwagi, in the furthering of research based on performance in construction-related fields that were completed at Badgers previous military career in facilities management at West Point. He showed Kashiwagi the work at hand and then proceeded to move out of the way and allowed the diligent Kashiwagi to align himself without "rules" to where he could make a contribution. It was during this time that Kashiwagi was able to formally develop his theoretical behavioral models which served as the foundations to his multinational and multimillion dollar research efforts that are making revolutionary changes into the way that the purchasing industry works. Kashiwagi states that his research was not created from the philosophy but the MR environment at the university greatly "facilitated" his work. He says, philosophically, that "…having no rules made it easier for me to become." (Kashiwagi, 2009) This belief is an indication of easier personal alignment within a MR organization (Bennis, 1997).

Minimal Rules Productive Results

Badger theorizes that the creation of a minimal rules environment allows for the nurture and growth of several desirable qualities within individuals. This is by the analysis of both the Semco and Skunk Works

organizational reviews. A summary of such characteristics of MR leadership is given below as proposed by the three case studies to be what is increased as shown in Figure 6.

- Freedom to Think
- Autonomy
- Freedom to roam
- Freedom to experiment (tolerance of failure as part of the teaching and learning process)
- Acceptance of failure as part of the process
- Freedom to disagree
- Accountability in subordinates
- Common Sense thinking
- Smarter workforce
- Innovation
- Creativity
- Group that finds their own solutions
- Less Management Required (Self managing)
- Creative Solutions to problems
- Pride in workmanship - control over own destiny & quality
- Simpler process maps
- Drive in employees
- Ambition
- More people understand what is going on (supply chain)
- Exceeding expectations (no minimum standards)
- Self Actualization, the ability to “become”

MRL limitations and fallout

In the review of the above cases it is apparent that there will be failures and detractors of MR and its possibilities. A common thread of MR applications is that management needs to let go of power and control so that subordinates can grow into their creative and empowered roles (Farid, 1993).

Ricardo Semler tried in vain to convince much of his management of his MR philosophy and in the end he opted to let go of a large percent of his management simply because they wouldn't support his leadership style (Semlar 1995). The Skunk works group knew that most supervisors "loath to grant freedom and independence [which were]...necessary ingredients for running a successful Skunk Works enterprise". The group's longtime leader, Kelly Johnson, said that "Control is the name of the game and if a Skunk Works really operates right, control is exactly what they [in upper management] won't get." (Rich, 1994) Kashiwagi has even gone as far as behaviorally classify those who cling to a rules and bureaucratic environments compared to those who can achieve without such distractions (Kashiwagi 2008). Even Badger indicates that MR is a philosophy only for the minority of managers who are truly willing to give up power and control to their subordinates (Badger, 2009).

Transformational Leadership (TL)

With various elements and combinations of change-promoting environments, the emergence of the transformational leader has taken the stage of leadership styles that more comprehensively promote changes

within organizations. This trend, which has gained momentum over the past decade and a half blends varied leadership efforts in navigating change and has given a face or personality to the movement (Ashforth, 2012). This type of leadership approach both starts and centers around a change "champion" in leadership who pushes the development of vision, intellectual stimulation, rethinking of norms, institutionalization towards vision by creating a motivated following (Tichy & Ulrich, 1984; Eisenbach, Watson & Pillai, 1999). This leadership style succeeds at pushing significant changes via fostering higher levels of motivation, engagement, devotion and trust as compared to more traditional leadership styles (Kreitner & Kinicki, 2008).

Transformational leadership promotes transformational learning which allows organizations to discover its need for change internally and self-learn its way to accomplishing its goals (Tobin, 1996). This type of learning also has ties to the transformational learning trend which was gaining its initial momentum during the same era. (Taylor, 1997; Kitchenham, 2008).

TL Summary

Thought the study of organizational change has gone on for a good part of the century, it is only in the past couple of decades that have linked its effectiveness with supervisory practices and styles. Change at these levels is still very much a group effort involving all levels of a hierarchy. However, a greater understanding of the impact of leadership on

facilitating change is becoming apparent as it relates to subordinate management as the environment that they supervise. Therefore, it could be stated that a leader is also a steward over their organizational domain.

Factors of Successful Change in Organizations

In 1995, John Kotter, a professor at Harvard Business School, wrote a seminal paper outlining eight of the main reasons why most organizational change efforts fail in practice. This paper, which summarized his observations of over a hundred change efforts, has become one of the most cited pieces in the field of change studies due to his approach to the array of problems and experience in transacting group change (Ashforth, 2012). A summary of the reasons can be listed centering on items such as urgency, team building, vision creation, communication, persistence, planning and facilitating change. Interestingly, each of the reasons for failure show strong relativity to the performance of leadership in administering change as a process.

During the same decade that Kotter's topic rose to eminence, further links between improved organizational change studies, validation practices and change management to the process of longer term tracking were also being established (Armenakis & Bedeian, 1999). Methods involving leadership roles in initiatives were further analyzed and more sophisticated strategies were developed in the progressive movement toward better effectiveness in creating change (Kotter, 1979; Kerber & Buono, 2005; Pettigrew, 1990).

Focusing on the larger perspective of organizational change studies, an increased push for more fluid initiatives emphasizing strategic, long term and large scale targets began to emerge. Roles of leadership became more centered on vision and motivating others and less on pushing and enforcing the achievement of desired changes. This newer movement of thinking was believed to be patterned after theories of continuous improvement as promoted by auto industry practices at the time (Demming, 1982) as well as the writings of Beckhard who introduced the more long-term approach of organizational change which he referred to as "organizational development". He outlined these environmental change features as being:

1. Planned
2. Organization-wide
3. Managed by upper-level top supervisors
4. Aimed at increasing organizational effectiveness and health through planned intervention in the organization's "process," using behavioral-science knowledge (1969).

This ascending field of development included ongoing commitments towards training and education, coaching, confrontation meetings, and data feedback cycles where change is accomplished through an emerging approach which considered organizational ground rules

which were intended to be of longer term and larger scale (Schmuck & Miles, 1977).

Change Management Model Development

It was during this time of the 1990's that researchers began turning their efforts to elaborating on Lewin's planned change model by adding more sophisticated steps to the process of change in organizations. These newly introduced steps addressed the complexities of change, as Kotter's pioneering work helped to introduce, and methods of helping to facilitate the change process. This period brought about a great proliferation of theoretical models that claimed variations of success based off of their authors experience and other factors of observation. However, before addressing the details of such models, it is important to consider the building block information that helps the reader to understand relevant assumptions of model development and testing.

Model Analysis

A model by definition is a representation, processor system that attempts to create specific outcomes with the prescribed sequence of measures. As Da Costa and French construe, it is a set of structured theory with a purpose to emphasize a scientific point (2000). It can symbolize a phenomenon in general terms that serves as a focal point in a scientific perspective for the sake of learning.

This section addresses the framework involving model development as it relates to theory while in the observational case study setting. It is

within this environment that socially scientific studies most commonly attempt to validate such proposed principles and enlarge our understanding of human behavior in organized settings. For the sake of outlining this research, relevant aspects of model building are addressed in the lines below. These are listed below.

Model Purpose

While a specialized component of models lies in the promoting of learning in emphasized areas with the specific intent of simplifying the complex makeup of a proposed observation. (Apostel, 1961; Redhead, 1980). Specific learning takes place in areas of model construction, manipulation, denotation, demonstration and interpretation (Morgan, 1999).

Constructive Makeup

Methodology of model building is quite loose and as diverse as the scholars who propose them (Frigg et al., 2012). Therefore, models are often displayed conceptually in various means such as physical representations, flow charts, sketches and written prose.

Theoretical Interchangeability

As a part of addressing the subject of models, it is also important to understand their hazy and overlapping relationship with theory. Though used interchangeably in loose descriptions, the difference in interpretations by scholars adds clarity only to the fact that their meaning can be relative. On one hand Friggs et al., describe a theory as being the

framework for creating models and that the theory represents what the model depicts (2012). However, other academics suggest that a model can be used as a substitute when no current theory exists, giving the explanation that model can precede theory in learning (Groenewold, 1961). A third conjoining concept advocates that theory and models can be linked through a "developmental" association which serves to articulate an unwritten or incomplete theory (Leplin, 1980). With such an array of perspectives in relative theory and model application it becomes inherently critical that that the author of a model specifically establish the relationship between the two as a part of their development of a scheme of understanding.

Replication and Testability

Though many models are purely theoretical and serve only to promote thought and discussion on topics, greater usefulness of models is found with their inherent ability to be recreated and even validated in either simulated or empirical settings. Because of this, it is common to find a relationally-prescribed set of inputs and outputs to give the structure a testable, and even predictable, objective.

Social Science Modeling - Human behavior in case study observations

As this research takes part in the formulation of a social science-based model with the aid of controlled case studies, a few unique and notable elements should be addressed. This is especially true with this

area of study where very little previously related theory has been postulated and tested. It is this mix of theory and model development in uncharted domains of real-time observational case studies that deserves further discussion.

Specific to the social science studies, the use of modeling with human behavior adds higher levels of complexity to be analyzed as fields such as psychology, sociology and others are intertwined with the formulation and calculated responsively of such tests. Equally complex in the study of human behavior is the orchestrating of such tests in a case study setting where the natural flow of responses is essential to obtaining a more true validation of the proposed ideas.

Case study models are deemed as more robust compared to statistical and formal models because they contain a higher level of conceptual validity and substantiation (George & Bennett, 2005). This is due to the fact that if it a series of events were observed in a truly natural setting, it cannot be refuted by opposing opinions because it is factual and documented.

Expanded exploration of case study validity is found in the observance of varying dimensions of time and level of measured results. This is due to the fact that exploratory research, interpretations of the relationship between empirical case studies, theoretical development and the application of models can be linked and rated by levels of substantiation. Behavioral research blended with methodological

constructs is capable of creating an abundance of models that can be used as fodder among theorists. However, these models gain their greatest validity via case studies where the methodology is tested with live subjects in real environments with documented results (Sullivan, Kashiwagi & Lines, 2011). As applied in real-time, compared to historical post-analysis, it is this actual test on live participants that gives the creation of a model its figurative breath of life (Lee, 1989). It is this inductive generalizability that methodologists not only accept as reliable research (Benbasat et al., 1987), but place greatest confidence in, where theory is both novel and limited (Eisenhardt, 1989; Lee & Baskerville, 2003). Langley, in her discussion on sifting through observed or "process data" towards case study research, articulates this relationship with the empirical and theory validation by stating that "theory development is a synthetic process. Whatever strategy is used, there will always be an uncodifiable step that relies on the insight and imagination of the researcher" (1999, p. 707). Thus, when creating theory and models with case study material, the compilation can be deductive, inductive or even both. However, there must also be a creativity aspect to the formulation of such things.

Delving into more specifics of process data analysis and model creation, it is emphasized that measured standards should be established by the researcher in order to establish ground rules in observation (Huz et al., 1997). Another approach to case study model development is given by

George and Bennet outlines various issues of recording observed responses in case studies. A summary of these points are listed below:

- Validating goals of a model with measurable variables
- Self reported results vs. "objectively" establishing cognitive changes
- Measuring cognitive changes are difficult and "risky"
- Measurement level(s): reaction level, behavior level, group level, organizational level
- Observed from historical data or in real-time
- Which data to use? Content analysis, interviews, questionnaires, or observation (2005).

In compiling such data, they also advise that care must be taken in order to avoid biases in human observation because the accounting of observances can be swayed by differing interpretations.

A final element of case study practice in theoretical model development is illustrated in a type of model fabrication known as group model building. This system of construction specializes in the observation of groups, referred to as "teams", over a period of several meetings with the intent of encountering patterns and other evolutions that take place over time. In such observations, sequential items such as pre-meeting information, group background, relationship between members and

participant contact are recorded as a part of the observation (Vennix, 2001). As a part of the gathering of team response data, it is also useful to account for various peripheral information that was typical of meeting settings. The following list of items is worthy to note here:

1. Meetings and participants
    i. Number and characteristics of attendees
    ii. Meetings: number of meetings and average duration
2. Modeling procedure
    i. Education material
    ii. Flow charts or diagrams used
    iii. Supporting techniques
3. Facilitation aspects
    i. number of facilitators and their roles
    ii. degree to which facilitator steers the discussion
4. Meeting logistics
5. Contextual variables that may influence results (Anderson, Richardson & Vennix, 1997)

Change Model analysis

Almost simultaneous to the expansion of understanding "environmental" factors in change were the introduction and growth of "modular" constructs of such endeavors. This encompasses the arrayed entrance of varied models over the past 25 years by researchers in an effort

to standardize abstract patterns of change. Though these models had matched characteristics to Lewin's original 3 step process for planned change, several elements of hypothesis and structure had varying interpretations of specifics or fully contradicted each other (Todnem, 2005). As to why such a trend took place, it can only be guessed that it was a mixture of the emerging understandings of this fields crucial value in avoiding failed changes blended with technologies that allowed for improved documentation and analysis to such research.

Regardless of the reason for such an explosion in change model proposals, a rigorous search to identify and classify such models was conducted for the sake of understanding common patterns as well gauging strengths of varied models in the area of empirical research. This analysis, as found in Table 3, demonstrates an array of than 12 OC models presented by researchers publishing varying degrees of structure and success in the intervention process.

	Standardized Data Set Used	Relative Case Study Use	Empirically Implemented	Author Experience Used to Develop	Data Collected Retroactively
Lewin '47				X	X
Bullock, Batten '85					X
Hunsuck, Loos '89					X
Nutt '86		X			X
Judson '91				X	X
Burnes '92		X			X
Kanter et al. '92				X	X
Kotter '95				X	X
Galpin '96				X	X
Armenakis et al. '99		X		X	X
Moran, Brightman '01					X

Table 3: Analysis of OC Models

With the exception of Lewin's original model, all of them span between the mid-1985 and 2009 but the 3-step process introduced in 1947 is listed to allow for an analytical comparison. All models were developed from cases or experiences of the contributing authors following the historical review of such events whereas half of them relied on author's experience in their makeup.

Interestingly, none of the model publications reviewed had notable standardized data sets that could be replicated in further research. Additionally, of all 11 models, none of them were empirically implemented as a part of their introduction.

It is also worth noting that less than half were related in what is considered a live case study with real subjects in spite of the fact that some leeway was given in defining case studies so that if a few cases were cited relating to the model overlay, it would be counted as having such. This is

an important factor to consider due to the scientific criteria of validation. Langley articulates this relationship with the empirical and theory validation by stating that "theory development is a synthetic process. Whatever strategy is used, there will always be an uncodifiable step that relies on the insight and imagination of the researcher" (1999).

It is also important to consider that in such exploratory research as change management, the interpretations of the relationship between empirical case studies, theoretical development and the application of models have greater value when linked in a cohesive manner. As shown in the table, research blended with methodological constructs creates an abundance of models that can be used as fodder among theorists. However, these models gain their greatest validity via case studies where the methodology is tested with live subjects in real environments with documented results (Sullivan, Kashiwagi & Lines, 2011).

Whether applied from initiation or post observation, it is this real test on live participants that gives the creation of a model its figurative breath of life (Lee, 1989). It is this inductive generalizability that methodologists not only accept as reliable research (Benbasat et al., 1987), but actually place greatest confidence in, where theory is both novel and limited (Eisenhardt, 1989; Lee & Baskerville, 2003).

Another substantial pattern observed in the review of the models is the use of quantitative analysis or measurement to establish a basis for validity in the process. This would have included an establishment of any

type of units, such as dollar amounts, risks, breakdowns in machinery, compliance levels to regulations etc., where a level of change could be measured and possibly linked to the change model function. This establishment of metrics would serve as an integral indicator of whether change was exacted or not. It would also aid in the assessment of the impact of the model as a whole

From this review of metrics and impact assessment a second notable void is demonstrated in the application of such proposed models. While 4 of the models show referenced links to case study application, none of them actually run a recorded real-time test of the model to help validate its effectiveness.

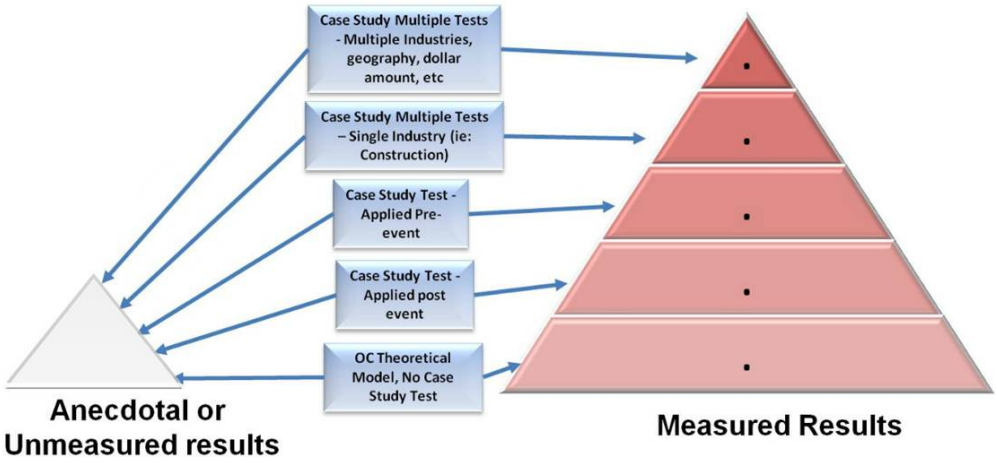
Though such analysis does not intend to refute the effectiveness of the change models of such researchers in any way, it does intend to illustrate the voids in the research patterns which verify that change took place through some system of standardized measurement. Such uncharted sections in organizational change research represent a common problem of organizing a sufficient empirical environment that gives measurable evidence of change having occurred. (Taylor, 1997; Anderson, Richardson & Vennix, 1997; Sullivan, Kashiwagi & Lines 2011; Todnem, 2005).

Summarizing the common problem with the models in comparison, it becomes clearer that the strength of such model-based research is

diminished by the fact that it is lacking in the following three areas. These are listed below:

- Real-time case study observations (compared to historical analysis)
- Establishment of standardized measurement for change
- Demonstrated impact of the model through such measurement

Figure 4 shows an illustration of varying levels of model strength as elements of validity are added to the strength. This pyramid is both hierarchical in that each level is increasingly difficult to achieve yet adds strength to the validation of a particular model.



Case study Testing vs. Case Study Testing with Measurement
Pre-event = model defined and applied before measurable results take place

Figure 4: Hierarchy of Model Tested Strength

The lowest level of the scale being where most change models reside produce no specific case study and are based off of developer experience as well as bits and pieces of anecdotal events. The second layer being where

there is a case study testing of the model but the data evidence is collected following the event of change therefore requiring historical interpretation via surveys, interviews and assumptions of the researchers. It is between these two levels that all of the analyzed models of change are found.

Moving up the diagram brings a higher levels of strength in observation to a particular model based off the progressive validation, and therefore, further sterilization of results that can be made. Though theoretical in nature, these higher levels of model testing are possible if the resources, coordination, and standardized measurement of such events were available (Yin, 2003; Benbasat et al., 1987).

For example, the third level would be a case study concept where the proposed model was to be applied to an environment *before* the observation were to take place. In such a case, the model observation point (MOP) would be at the inaugural point in time of testing as compared to a historical perspective.

Further building on this inaugural, or IMOP, concept is outlined in the next level of the diagram where a tested model (or a relative derivative of it) is in turn re-tested in a similar environment (such as a second and third tests within a similar industry) and later tested in varied environments, (crossing industrial, cultural, geographical boundaries) to verify results. This additional research, though infinitely more difficult to conduct in behavioral observance, would again vastly increase the

verification of its validity due to the fact that its tested levels is greater across varied environmental fields (Lee & Baskerville, 2003).

Performance Based Model Testing Approach: Real-time Observations of OC

In consideration of the difficulties of model observation and testing and the recent academic review of validation strength it is worth noting a particular research effort has made notable headway in addressing such voids in empirical studies with live subjects in their natural organizational settings. A historical description is given below of its origins, theoretical assumptions and current approach to organizational change in improved delivery systems and how it is tightly linked to project management. Being primarily inductive in its methods, the research entails extensive general observation of group changes where general patterns of human nature are derived towards specific framework models of behavior which can be tested.

PBSRG Core Team Education Strategy

The Performance Based Studies Research Group, or PBSRG, is a research group based out of Arizona State University's Engineering school. Since the group was formed in 1994, its primary function has been to help organizations both for-profit and nonprofit more correctly measure their environments so that decisions in procurement would become simpler and easier to make due to clearer understandings of their environment. The underlying framework for the research group push is that the supervisory

and subordinate relationship in organizations is critically flawed which explains its current losses in efficiency and profitability (Kashiwagi, 2010).

Theoretical Background

In the above description, it is helpful to summarize important parts of the theory. First, an understanding of the defined characteristics of events is a critical building block to Information Measurement Theory, (IMT), a framework for measuring the critical aspects of one's environment in order to gain bearings, alignment, vision and direction. Secondly, it is important to have comprehension that information gives power to the predictability of events. This is especially true when the information is relevant to the outcome of an event. Lastly, the efficient management of information is crucial to having some predictability of events. This management includes efficiency in collection, compilation, differentiation of critical and noncritical information, prioritization final simplification of the informational data being considered.

Information Measurement Theory (IMT) in its true state is both broad and ambiguous by definition. However, its application has been known to have notable success in understanding both work-related and interpersonal testing. The concept of predicting outcomes of events can also be applied to such precision points as the management of projects, contracts, initiatives and other efforts organizationally. This application, as is done in this research, has the special attribute of being able to be scientifically tested as due to its predictive quality.

Kashiwagi Solution Model (KSM)

This theory is used to help generalize characteristics of people in order to understand their tendencies as they relate and interact with others in a working environment. The model characterizes individuals as more "left sided" or "right sided" based on a graphical display of traits such as temperament, comfort in planning, ability to simplify perception of their environment etc.

One of the essential human attributes that is identified in the use of the Kashiwagi Solution Model (KSM) observation is the acceptance that an individual cannot control or manipulate another through acts of coercion or force. This attribute is contrasted with the opposing belief that an individual cannot control, manipulate or coerce another in normal environmental observation. This concept of control is a key basis of the KSM theory as it relates to the proposed model of education and measurement. Under KSM assumed theory, it is understood that individuals who believe that they can manipulate, coerce and control others tend to be more of what is considered a "right side" or "type c" person. They would also be more likely, under theoretical assumptions, to have greater difficulty aligning themselves with the initiative of environments of higher levels of measurement because of the likely increased levels of accountability.

This increased perception is believed to be negatively correlated with the individuals need to make educated guesses or "decisions" based

off of a lack of key information as described in the information measurement theory section.

Best Value Practices (BV): A blend of IMT, KSM and Leadership-based Administration

Though KSM and IMT are theories that were created to better understand human nature and the environment that we live in, its application has also been utilized in the creation of a delivery system for project management which takes into account the humanistic component of what makes the delivery of a successful project possible. This fusion of the two theoretical perspectives applied to a working environment of project and contract management as well as other organizational change efforts has become known as the Best Value process. This process includes the methods and practices of measurement, education and administration which help to optimize the environments of those who participate.

The organizational scope of this definition includes both client-vendors as well as supervisor-employee relationships in both for-profit and nonprofit organizations. This is deemed to be possible as rudiments of human nature and abstract information measurement transcend conditions of profitability and leadership-follower relationships.

Sustainability in Administration Practices:

In addressing the question of what is sustainable within the realm of organizational change, it should be simply answered by outlining what productive and value added behavior is profitable for all performing

parties of the group over the longest measurable period of time that feasibly applies to the organization's goals. More specific to this research, BV practices promote sustainable administration of a subordinate or vendor as well as the accomplished intentions of a supervising or purchasing party. Therefore, it is this singular relationship between a supervising and a subordinate party, whether individuals or groups, to which this definition should be applied and keen observations made.

The resulting output of such a relationship should be a reasonably constant flow of what is commonly known as a win-win relationship where the term "win" refers to being profitable or validated in some way that is of value to the parties involved.

BV Principles and Methods

1. Stop and temporarily disengage from the current path that you are taking.

2. Deeply think or ponder the situation and attempt to answer simple questions about where you are headed, why you are going that direction. This analysis also includes the assessment of what changes need to be made in direction or velocity from the current status.

3. Make a plan to change or continue in the desired direction. This plan should be realistic, true to the individual's goals and capabilities. It should also be detailed enough to consider

elemental outlooks of scheduled time, finances and specific measurements that will show the completion or failure to complete the goals.

4. As a major part of the assessment and planning, a thorough consideration of major risks to the plan fulfillment should be made which categorizes and prioritizes the size of them. Alongside of each risk, a plan should be created which outlines how each risk will be avoided or mitigated.

5. The plan should be implemented with periodic checks to verify compliance. Measurements should mainly track any deviations from the plan. Revisions to the plan and risk mitigation should be made periodically to look for deviations (Sullivan, 2012).

For close to a decade and a half, the research group focused on construction project management as it relates to the contractor-buyer relationship allowing for more efficient purchasing decisions and better management of contracts. However, as the documentation of such observations was applied in predictive tests, it was found that the early model of improving project management in construction could also be applied in other areas of management. In recent years they have expanded their education and process training to other service managed outsourced areas such as food services, media rights, health insurance services, and information systems. This tool, recently referred to as the Performance

Information Procurement System (or PIPS), has been tested in various controlled settings of project procurement and management. In the process of expanded education, the group has developed an outlined system of helping their clients in the process of change from the old ways of outsourcing to a newer and more efficient way.

This process has taken part in the tactical planning for helping improve organizational efficiency and has outlined its basic strategy as listed below.

Phase I - Pilot Phase

Consistent and constant education: Education and training are in integral part of each of the future states of running the PIPS process.

Benchmarking the current system: Information gathering on the current status, processes and metrics of the organization. This information is typically divided into schedule, financial, and Quality measurable for tracking purposes.

Selection of a "Core Team": This team is a group within the partnering organization to learn the PIPS process and carry out the first pilots. Ideally, this group will become the source experts in the methodology and theory and train others during the possible expansion period.

Running of Pilots: Because PIPS is a set process, its adaptation to organizations is not allowed until the pilots are complete. This means that the pilots are run with specific rule to be followed and understood initially.

Phase II. - Gradual Expansion

When the Pilot, or group of pilots, are complete, the metrics data (from step 2. Benchmarking) is collected and gradual expansion of the system is strategically and adaptively planned and implemented. Core team members begin educating others and the understanding of the system spreads in an organization.

Phase III. - Transition to Institutionalization

Core team becomes leaders in process management and training, program becomes an across the board option and benchmark items are continually tracked and reported to partner (Stone, 2009).

Throughout the process of piloting and expansion, there are arrays of changes organizations that can be described as either direct practice changes demonstrated by individual behavior or indirect results which are responses from behavioral modifications

based on the change effort. An arrayed list of such changes is listed below:

- Moving away from Low Bid Mentality
- Sustainable (Win-Win) business practices
- Greater emphasis in Planning (Projects, Events, etc.)
- Minimizing information needed to analyze and measure environment
- Empowering the Expertise on projects (Not supervisors)
- Decreased emotional responses to drive alignment
- Weekly Risk Reporting of accountability (Transparency)
- Subordinate Empowerment
- Emphasis on more Detailed Planning
- Reduction in Project Hassles
- Reduction in Relationship-based Business Practice

The group has recorded and compiled case study data in order to gain a larger perspective on management practices that are more effective and less effective. Over 1000 tests run with standard measurements recorded and applied towards improving on the process of education and measurement.

II. ORGANIZATIONAL MEASUREMENT OF PERFORMANCE

Central to the issues of organizational change and development is the ability to either validate or refute the effectiveness of the environmental factors and modular inputs. Hence, a standard of measurement becomes essential to the gauging of such progressive

learning in its various facets. The link between organizational change and measurement is essential because it not only validates the impact of change management systems, but it also helps to create the much needed standards for modeling and tracking effectiveness of change efforts. Therefore, a focus of the study of metrics is created which deals mainly with the measurement systems of organizational benchmarking, change and alignment of expectations between supervisory parties with their subordinates.

A metric in the built environment is described as "a quantifiable, simple, and understandable measure that can be used to compare and improve performance (Pitcher, 2010). It is not simply the mindless tracking of events or collection of data but entails the quantification and simplification of such data into usable information which augments the alignment or improvement of performance. When applied to organizational goals in industry, it is closely tied to a benchmark set or initial measurements and used longitudinally to demonstrate progress over time. It can be effectively stated that measurement at the organizational level is "The systematic process of measuring an organization's performance against recognized leaders for the purpose of…superior performance when adapted and utilized" (Pitcher, 2010).

Metrics Objectives and Optimization

When applying metrics and the metrics cycle to organizational efforts it can be assumed that the goals of such applications are to

measurably improve the delivery process to assess direction and achievement of larger scale objectives. However, a deeper examination of its purposes, attributes and dimensions gives great insight to the effective use of such tools. Metrics in industry allow users to measure performance objectively, compare project performance, set management goals for project teams, incorporate continuous improvement, validate management goals, and improve project and company performance.

In order to view the significant advances in organizational metrics use, it is helpful to classify them into progressive and integrated categories in order to distinguish them by their purposes. Because of their evolutionary progress, they do tend to follow a historical progression in sophistication through the twentieth century.

Foundational Metrics

These measurements can be classified as traditional or hard metrics where items tracked are simple and easiest to understand. Examples of this include items such as general dollar measurements, units produced or sold, or productivity. Typically, foundational metrics encompass standard accounting, finance and most basic measurements in productivity or sales of workers or units which, in large part, stemmed from the early twentieth century (Chandler, 1977). These units reflected the economic structure of the industrial revolution in terms of profit driven expansionism and capitalism in an environment of endless resources. These measurements are a mainstay of how organizations are compared and contrasted.

Though still drawn heavily upon today, foundational metrics have been gone through regular scrutiny over the decades to streamline their significance (Banks & Wheelwright, 1979; Hayes & Abernathy, 1980; Kaplan & Norton 1992).

Foundational Examples in Finance and Production

- Total divided amounts divided by period as needed (week, month, quarter year etc.)
- Commission breakdowns
- Revenue or profit based sharing
- cash flow figures
- Who pays for what under normal and unforeseen circumstances
- Units produced or sold

Scope

- Clear description of which party does what and what is to be completed
- General intent of the supervising party mixed with the subordinate plans to complete

***Schedule-based*:** Longitudinal link between time & units measured

- Start and finish dates of agreed project or contract
- Longitudinal link between time frame and units accomplished

- Reporting Schedules to update metrics: Weekly, quarterly, etc.
- Adjustments to contract (plan to plan the unknown periodically)
- Deliverable at each milestone and planned meeting

Integrated Metrics

Towards the middle of the century, a new levels of measurement sophistication emerged with a seminal study conducted by General electric in 1951 where light was shed on more sophisticated and embedded information that helped in both assessing status in organizational endeavors. These more technical and progressive indicators enable the gauging of conditions of the corporate health with reference to environmental factors. These items began with market share and customer satisfaction but later expanded into other areas such as quality levels, perceptions both internally and externally of user satisfaction (Neely, 1999). The probes for such information dug into what may be called "softer" data within the office and factory walls as well as within the perceived minds of its members in helping to decipher, delineate and diagnose the current environment. From this conglomerate of new and related standards, the linking of various forms of data to create triangulations of comprehension and perception are enabled.

One way to determine the difference between Integrated and foundational metrics is by observing which individuals from an organization focus on which metrics. Upper management and executive-level members focus on Foundational figures to help them make decisions

in guiding the group. Mid-level managers and lowest level members focus most on the integrated indicators. For this reason, integrated metrics are by far the largest and most specialized group of measurements potentially but have not surpassed foundational measurements in importance which has a greater tendency to be applicable across industry boundaries.

Integrated Examples

SLA's: Service level agreements are typically integrated into service type contracts or agreements as terms of the agreed relationship between parties. Often, these figures are to be maintained at predetermined levels and reported regularly to demonstrate compliance. These can include averages of time, units or levels of quality based off of production or customer satisfaction.

MOU's: Memorandum of understandings are somewhat at a sub-level of what SLA's are in that they may or may not be included in the contract text but are assigned and agreed upon as measurements that show compliance to the agreed expectations. While similar to a "gentleman's agreement", an MOU is formalized in writing but not necessarily signed by either part.

KPI's: Key Performance Indicators tend to be both task and industry-specific measurements that evaluate progress or success of more technical aspects of organizational operations. At times, KPI standards are established by benchmarked

averages of similar organizations such as productivity standards or similar departments in other organizations such as financial ratios. Of all integrated measurements, KPI's are likely to be the most technically specific and understood through expertise within specific fields.

Other Miscellaneous Indicators: Other reasonable reporting requirements from the client and other key items that may be industry specific or relevant to the industry may also be considered as a part of the Key Performance Indicators.

Comprehensive Metrics

As the above two types of metrics cover the majority of measurement, there is an emerging system of monitoring status and progress in organizations that has come to play in the past decades which allow for a comprehensive perspective in organizations. This type of measurement, which has commonly been embedded in "project management" fields, entails the measurement of risk assessment, risk mitigation planning and lastly, the measurement of deviations from proposed plans. This type of measurement is likely the most sophisticated of all measurements due to its requirement of comprehensive environmental factors in order for measurement to take place. These factors include the following.

1. It must be understood and accepted that risks that are avoided or mitigated before they become current problems are less expensive to manage than risks that are left to arise by chance. It is this navigation process that is the essence of what is measured.
2. Individuals doing the measurement need to be the expert of the organizational group
3. See person is typically a lower-level member but reports on actions of higher members if they pose risks to the achievement of the organizational goals.
4. Measurement requires extensive planning and documentation in scheduling, expectations, etc for measurements to be effective.

While most measurement focuses on current-to-past events, comprehensive measurement reports on present-to-future events that have a likeness of occurring. This means that comprehensive metrics can be defined as preemptive in that they steer a project or organizational effort towards the simplest and most efficient path to its objectives (Kashiwagi, 2008).

By their nature, comprehensive measurements are considered to have the highest level of sophistication because they require that the reporting individual have the ability to thoroughly understand both

foundational and integrated metrics while creating a simplified yet dominant assessment of the issues at hand. This "comprehensiveness" in vision of what is to be reported for measurement and what is not, requires that this individual be closest to the day-to-day occurrences in a project as well as the expertise to properly evaluate the risks at hand.

However, it is safe to say that these groups build on each other and have stood the test of time in organizational practice. None of the three groups are considered more important than the others and no single measurement is being proposed as a "silver bullet" in the tracking organizational status. However, in practice, it may be more typical to find a hodge-podge of unaligned and unrelated reporting systems concurrently at work (Neely, 1999). Additionally, It should also be noted that this grouping of measurement elements is merely an attempt to lay the base for which such comprehensive metrics sits.

Risk Assessment and Mitigation

Client review of each possible perceived risk to the contract being on time, within budget and at an acceptable level of quality. Risks divided into controllable (in house technical type risks) and not easily controlled.

Having a detailed plan to mitigate each of the not-easily controlled risks. This plan should be prepared and presented at a sufficient level to make the client feel comfortable with their vendor.

Metrics Management and Strength Assessment

Metrics varieties and quantities within organizations and contracts are legion. It is common in organizations to attempt to measure itself and soon become inundated by piles and piles of data that are neither understandable nor useful. For this reason it is important to be able to filter and gauge what are considered to be effective measurement data points as well as methodology in assessing what is redundant, misleading, counterproductive and wasteful in workforce environments. An analysis of effective metrics assessment is given below with 13 criteria for measurement in their workforce. This criteria list is derived from the CII studies as well as the author's internal assessment of researched measurement with the PBSRG (Pitcher, 2010).

Ease to Input: Collection, compilation and display of the measured items or reports.

Compliable: Ability for the data measured to be easily compiled with other data in the past future as well as laterally by using totals, averages or other statistical methods. Typically, numerical data points are compliable.

Simple: Actual measured and compiled date is kept as simple as possible so that it is quickly and easily understood by all viewers. This also means measurements attempt to tell the most by using the lease amount of communication. This can be based off of larger data pools but must be narrowed or simplified towards simple

presentation.

Reliable: Sources of the data are verified so that it is as accurate as possible.

Verifiable: Those involved in the data gathering and reported are easily available to answer questions.

Timely: Regularly submitted and annotated when not submitted.

Cost Effective: Cost of recording software, user's expertise and user time are relatively.

Meaningful: Measured data is directly tied to elements of expected Schedule, Costs or Quality Levels

Related to Mission: Alignment of measured items with high-level goals of the organization and its leadership.

Drives Appropriate Action: Reported data help those viewing self align by making course corrections or maintaining current paths according to organizational goals.

Visible by Appropriate Audience: Key players in related groups are able to easily access and review the needed measurements.

Centralized Accessibility: Measured data is easy to access, because it flows to a centrally housed location where it is stored in a standardized format so that it can be easily queried and accessed in the future.

Metrics Learning Cycle: A Pattern of Organizational Change

In light of the accepted principle that learning and change are virtually the same thing, It can be empirically demonstrated that there exists a cyclical relationships between the use of metrics and organizational change towards group goals. This cycle can effectively be identified and demonstrated through an in-depth analysis of a well known case known as the Hawthorne experiments.

Hawthorne Studies Impact on Measurement

As outlined earlier in this review, the formalized documentation of such events as the Hawthorne studies have had a great impact on organizational research and testing. The generally accepted research showed that levels of productivity seem to regularly rise in each case until the termination of the study module where productivity peaked and then returned back to normal pre-study levels in the days and weeks that followed. As a part of the research findings, it was summarized that worker productivity increased with the psychological stimulus of being shown individual attention, feeling involved, and being made to feel important", and in another section, "Employees are more productive because the employees know they are being studied." (Mayo, 1949).

The results of such worked proved to be groundbreaking in that it spawned literally hundreds of other research efforts and close to a century of discussion and debate on the subject of human behavior and workforce productivity. For the next 8 decades on through today, these studies, now

referred to as the Hawthorne Experiments, became the source of a greatly debated subject between cognitive behaviorists, psychologist, sociologist, educational experts and even medical researchers. (Bramel & Friend 1981; Jones, 1992; Leonard & Masatu, 2006; Zdep & Irvine, 1970; Rosenthal 1966). The essential question that researchers ask of this study is this: what is the true meaning of the empirical study of this working environment and how does it apply elsewhere.

For the past century, this effect has been dubbed the "Hawthorne" or "Halo Effect" which gave credit to improvements in productivity to the added attention of management in carrying out the study or paying attention to the responses of the subordinates. This effect, however, has been highly debated in academic circles (Jones, 1992; Rosenthal, 1966).

One particular reviewed section of the Hawthorne studies revealed a difference in results depended on whether the subjects were shown their levels of productivity or not. Typically, the levels of measured output increased when the employees were able to see their progress whereas when management didn't show the workers the results of their productivity, there was no notable improvement. This research, naming the phenomenon as the "operant reinforcement contingency" made for a direct introduction towards the birth of a new study in the field of the effects of metrics-based feedback (Parsons, 1974).

Cycles of Measurement

With all of the debate on the validity of such claims for one side or the other, there is one thing that is clear and undisputed in the basis of the whole field that it has created. That is, there is an effective relationship between the measurement and display of performance to the response of the parties being measured. This cyclical pattern of using measurement as a driver of change in a cyclical fashion is applied in various industries (Plenert, 2000; Parsons 1974) and can be figuratively demonstrated in the Construction Industry Institute depiction of change shown in figure 5.

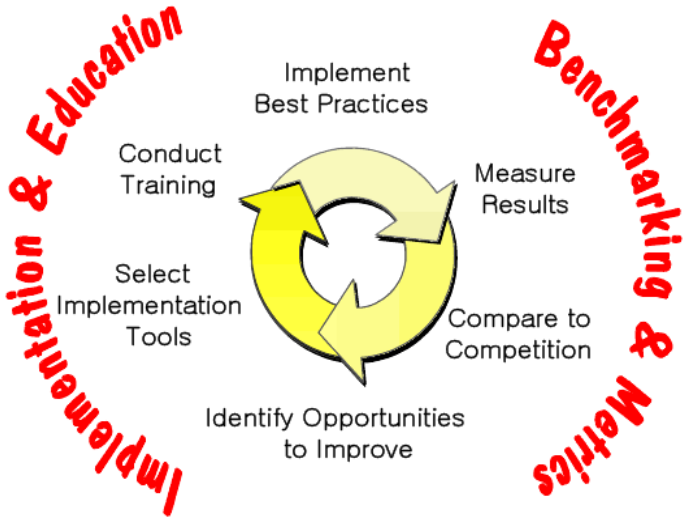


Figure 5: CII's cycle of Benchmarking and Improvement

The above displays the Construction Industry Institutes cyclical methodology of using measured benchmarks and education in the implementation of industry best practices. Though based off of industry competition for references, it is a clear example of the utilization of measurement as a basis for verifying status and progress.

III. EDUCATION AND LEARNING TOWARD BEHAVIOR MODIVICATION

As early as 1923, the research of Jian Piaget helped to greatly shape what can be considered a framework for modern learning theory in schools both private and public. His pioneering work with documented observations of how children learn while interacting laid the groundwork for both elementary and high school curriculum theory and development which still are in application today.

In his scholarly work, he identified children as "active seekers" of knowledge through their interactions both with people as well as things. Their cognitive expansion in absorbing and comprehending the world around them continuously grew in all areas of their interactions with a continual expansion of knowledge. Cognitive equilibrium, as defined by Piaget, was when things to a child's understanding and perception "made sense" and is in alignment of their understanding of how their environment works. Cognitive disequilibrium, however, represents when newly perceived material is taken in by the individual that does not align or register with the existing scheme of understanding and comprehension is left with a disconnect between what is perceived and understood. It is at this point that the individual undergoes cognitive adaptation, the crux of his definition of where learning takes place, in order to join personal perception and understanding of one's environment. This adaptation is accounted for in two ways. First, adaptation through assimilation of

perceptions with understandings and secondly, the mending of such disconnects via mental accommodation (Piaget, 1923).

It is from this expansive view of learning that many worldwide curriculum developers, both primary and secondary, draw as a part of their foundations in creating both teaching and learning methodologies. For example, Figure 6 displays a representation of the expansive and diverse nature that the National Research Council's model of learning that is used by the U.S. and international developers on how learning is understood and addressed.

Figure 6: Diverse Means from which Humans Learn (National Research Council, 1999)

This display illustrates that not only is human learning expansive, but it is also diverse in variation through multiple senses, arenas and cognitive capabilities of individuals

In combining the approach that Piaget's theoretical framework attempts to describe with the National Research Council multifaceted description, it becomes apparent that even within the confined channels of academic and curriculum learning, the human condition during cognitive interpretation are ever expansive and broad. For this reason it becomes necessary to narrow down the interpretation and analysis of educational learning to a more streamlined and refined level where specific observation can be best outlined and documented. It is this focused examination of educational research and practices that has lead this review to the field of what is referred to as "Transformational Learning", a theory and field of research introduced by Jack Mezirow in 1978.

Transformative Learning: Equating Change with Learning

The origins of such a framework began when Mezirow conducted research on the trend of the early 1970's where women were returning to continue with their college education following years of being away from the classroom. His observations and findings helped him to construct his initial framework which later developed into a more comprehensive theory of adult learning that involved specific changes in perspective of individuals and groups and how they affected specific changes of behavior (Taylor, 1997). Mezirow defines this process generally as a "social process of construing and appropriating a new or revised interpretation of the meaning of one's experience as a guide to action" (1994, p. 222-3).

This philosophy centers itself around a fundamental paradigm shift in perspectives as introduced by Kuhn (1962) and the observed learning process that leads to the transformation or change of one's outlook of their environment (Moore, 2005). Transformational learning is initiated by a disorienting dilemma which occurs in the lives of individuals within a group that creates a type of a jolt in their flow of routine thoughts and actions. Though typically described as hasty and sharp in its occurrence, it can also occur more gradually as well (Kitchenham, 2008).

The theoretical result of the disorienting dilemma leads to a flow of up to eleven documented steps that occur in the pattern which help to validate that transformational learning has indeed occurred. Mezirow outlines these eleven phases in their purest forms as follows:

1. A disorienting dilemma
2. Self-examination with feelings of guilt or shame
3. A critical assessment of epistemic, sociocultural, or psychic assumptions
4. Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change.
5. Exploration of options for new roles, relationships, and actions
6. Planning of a course of action
7. Acquisition of knowledge and skills for implementing one's plans
8. Provisional trying of new roles

9. Building of competence and self-confidence in new roles and relationships
10. A reintegration into one's life on the basis of conditions dictated by one's perspective
11. Alteration of relationships and Forging of new relationships (1978).

An integral part of such steps is what Mezirow describes as a period of "critical reflection" where the pre-existing paradigms that the group had about their perceived environment are questioned at their most primal level and the assumptions that were previously arranged go into a period of flux while new and transformed perspectives are constructed toward altered behaviors. This "perspective transformation" as observed by Taylor is the final observed product of the TL process and symbolizes a change in individual thinking that is to lead to changes in behavior (1997).

Though the study of transformational learning has become widespread and well known, a couple of limitations to movement are worth noting in this review. First, in following the flow and outcomes of TL, it is notable that the final stage or result of the theoretically framed process, the perspective transformation, is both elusive to define as well as difficult to quantify with data beyond the surveyed perceptions of individuals involved. Secondly, while there is an enormous amount of literature by Mezirow that covers optimal "conditions" for TL, there is little-to-no measured empirical research to validate the links of environmental factors contributing to transformational learning. In fact,

nearly 17 years after the introduction of the theory and 39 different studies via journal papers, conference readings and dissertations, Taylor articulates that the research is still lacking. Thought the preexisting research offered "insights" to TL, "none of these studies involved the actual application and testing of the ideal learning conditions outlined as fostering transformational learning. (Taylor 1997, p. 50)"

Approximately 10 years following, Taylor updated the progress of the movement of transformational learning with the following three relevant items. These included more longitudinal studies and peer reviewed articles, greater use of technology in data recording and increased use of measurement "scales" for gauging levels of responses. However, even with such advancements in research, the studies were still mostly historic and based off of anecdotal (qualitative) response data (Taylor, 2007).

Interestingly, this update shows that in spite of progress, the research challenges parallel that of what is found in the organizational change research. This is, that the empirical findings of such subjects are highly bolstered by historical data that needs to be interpreted by observers who translate qualitative events into validation of their hypotheses.

Conclusion

This extensive literature review was spawned from the need to obtain greater understanding of the existing studies in organizational

change. Its intent is to enlighten the steps necessary to more effectively transact orchestrated change in the management of projects so that greater performance can be transacted in organizations.

In the past century, many approaches have been made which tie in operational, psychological and educational aspects of change in an effort to measurably validate optimal processes as well as environments that facilitate change.

Though the research is abundant and broad, a closer look shows the that the data used in validating such studies is historically extracted in a post-observational environment and lacking data set standards that can be compared across varying studies. There are also no found studies made where the events were recorded in a "live" real-time progression.

Within the study of measuring change, the proposed framework of transformational learning has been helpful in understanding the sequence of events that humans experience as they learn new concepts. This learning has been equated, at least internally, to a form of change. However, the framework of TL concludes its expression with a change in perception, which is counted as an initial stage for more tangible and observable organizational change.

It is from this review that the groundwork can be laid which can attempt to fill some of the voids in measurement of OC, observation methodology and overall validation of elements that facilitate changes in industry.

Chapter 4

HYPOTHESIS & MODEL DEVELOPMENT

As an introduction to the hypothesis, specific segments must be clarified and pieced together in order to create a thorough and effectively articulated research question. In the case of this inductive research, these items include the problem statement and a stated set of objectives which will attempt to address such problems. This process will help to lead the study towards a singular question that the research wishes to answer in light of the current situation. Upon asking that encompassing question, a series of sub categorical hypotheses will be constructed which expand the question in an effort to both answer and validate the questions posed.

Initiative-Based Definition of Organizational Change

In light of the various perspectives of change at the organizational level, it also becomes essential to create a correlated definition of the behavior modification desired in this study's specific test. This definition acknowledges that OC can be compared to a vastly large and wide spectrum. In inaugurating this study, the focused area of such a spectrum is at the most basic observable level of behavior modification where a single differing action is counted as a point of recordable data. From this beginning, a clear description of what organizational change means is defined as a measurable and distinctive modification of activity at a group level or single group member that is based off of an intended initiative implemented by supervisory members.

Hypothesis Development

Taking consideration of the previously listed problem statement and research objectives, a singular research question is crafted which will, in effect, summarize the issue at hand and direct the investigation towards testable examination of further truths to be gained. This question, though likely asked previously, is reiterated with the new considerations of observation point in time, improved measurement and validation processes as well as a consideration of the diverse disciplined approaches of education linked with organizational change.

In an effort to fulfill the listed objectives, the underlying hypothesis asks and attempts to answer the fundamental research question of what are indicators and measurements of success and failure in management initiatives when education and measurement are applied as fundamental drivers of change?

This question is asked with the intent of creating greater comprehension of the predictive elements of the successes and failures of change and therefore be better be able to navigate future efforts of managed intervention. However, owing to the fact that the study of OC is vast and hugely complex, specific parameters are set in such a way so that the observation and analysis attempts to address the first and most minute levels of change as they progress into slightly more complex levels of interactive change. Specifics of such events are covered in the methodology section.

This hypothesis will test the consideration of Education and Measurement as primary drivers in organizational change in a case study environment where the Model observation point occurs at initiation of the subject test period. Interaction between these two factors of the theory are such that specific groups of individuals are educated on advanced measurement techniques in order to solicit change and the resulting changes are both measured and displayed in order to gain further momentum of change. It will also test the environmental factors of Supervisory support and Organizational trust as facilitators to the change process within the observable boundaries of this research. Specifically, it will attempt to validate whether such factors have no effect or the lack of them will have a negative effect on the defined organizational change.

Results will be measured in the form of standardized and definable levels of observable organizational change with multiple iterations as gauged through the defined measurements. These hypothesis tests are divided into various categories including general changes observed, friction levels, time of education, levels of rules, perceived management support of change, trust levels and finally performance visibility which leads to promotions. A compiled list of 16 hypothesis statements was organized in an effort to analyze and test its parameters. It is based on these hypothesis tests that the author attempts to answer such queries.

Hypothesis Category Questions

- Initiatives that involve Education of advanced organizational measurement positively correlate with measured organizational change.
- Education of advanced organizational performance measurement techniques correlates with reduced time transactions (in the form of formalized risk mitigation meetings) leading to a more efficient use of project team time.
- More time of education of advanced organizational measurement correlates to higher levels of simpler org change.
- More time of education of advanced organizational measurement correlates to higher levels of complex org change.
- Frictional points correlate to higher levels of collaborative change.
- Frictional points correlate to higher levels of general organizational change.
- Higher levels of friction points correlate with higher levels of hours and number of sessions.
- Lower levels of organizational rules correlate with higher Simple organizational change.
- Lower levels of organizational rules correlate with higher complex organizational change.

- Collaborative change is greater where supervising parties are perceived to be supportive in the change initiative.
- Greater levels of change occur when overall organizational trust is perceived to be higher.
- Higher levels of organizational change occur when there is a higher perception of preexisting measurement within an organization.
- Education of advanced organizational performance measurement techniques correlate with greater transparency of performance through friction between higher and lower performing individuals which leads to the promotion of higher performing individuals.
- Education of advanced organizational performance measurement techniques cause greater Visibility of measured under-performers which leads to realignment or demotion (HRE 2)
- Education of advanced organizational performance measurement techniques cause increases in transparency of individual performance as they aligned to the initiative vs. non high performers.
- Measurement in organizations has a greater influence on organizational change than other tested fields of trust, management support, or time of education.

Underlying Theoretical Assumptions

Before addressing the specifics of such questions, certain underlying assumptions of the research effort should be given attention in

order to clarify what is being embarked upon with such an approach. Such assumptions help to give perspective to the scholarly work as it relates to relative fields of project management, the built environment, sustainability and the like. Where many theses in construction management schools tend to cross over into realms of engineering, environmental science and chemistry, this research treads a much less traveled path into the softer science of human behavior, human development and human nature as they relate to the industries of project management. For this reason, three significant points are given as underlying assumptions of the research:

- Research is Theoretically-based in behavioral theory. Specific data, both qualitative and quantitative, are based off of social and behavioral sciences. This makes the alignment of such iterations to be a major and significant part of the way that the primary questions are answered.
- Validation of hypothetical questions is produced mainly through real-time observations and surveyed perceptions which follow such scientific methods. Therefore, such results will be considered as an empirical test of a singular theoretical model in human behavior across six different and unrelated environments.
- Analyzed data from the observations is to be synthesized with an interdisciplinary theoretical framework comprised of studies in

education, measurement and organizational change theory. This arrangement along with the real-time observation of the results is deemed as unprecedented in any known behavioral field as is outlined in the literature review of such studies.

Model Development: Education and Measurement as drivers of change

Among the more notable points of uniqueness of the model being presented is its simplicity in steps. While most models will have a minimum of 3 phases to summarize its process, this particular one involves the combination of two elements, education and measurement, from which a theoretical framework of change is constructed and tested observations drawn.

Considering the literature review's assessment of the voids in IMOP perspectives and shortage of empirical data tests, the author proposes the application of a model to be tested and recorded in real-time sequence to the evens of the subjects. This model, which applies the education of advanced measurement practices as a driver of change will be tested against existing research and literature from other scholarly work on the subject of managed change. This methodology groups supervisory and subordinate teams within organizations together as a whole as related incidences of change occur.

It could also be assessed that the model will resemble segments of various theories found in change management education but the

additional pioneering of measurement and observation point should be counted as a formidable contribution to such scholarly work. Therefore, it is proposed that this approach be considered exploratory and foundational in its findings for the sake of laying down scientific building blocks in the study of organizational change management.

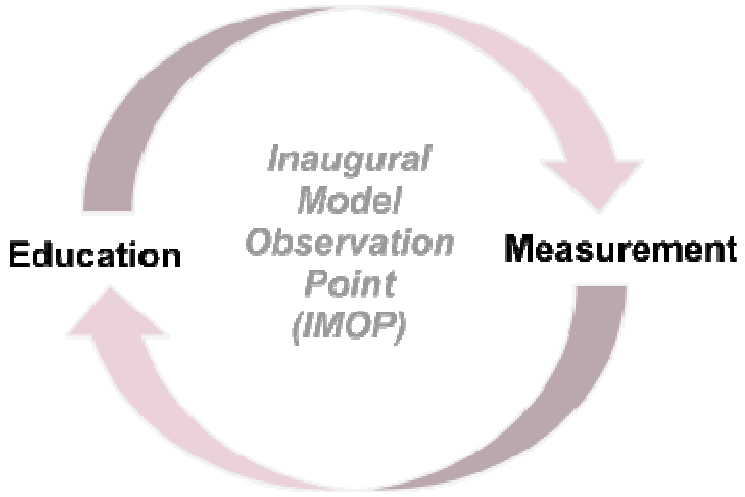


Figure 7: The Education and Measurement Model

As shown in figure 7, the cycle of educating subjects followed by measurement of their environment is conducted in a cyclical sequence. The section titled "education" deals with teaching modules on the specific and detailed goals, intent, desired outcomes as well as specific technical rudiments of the modified procedure. Also included in this education is the learning of advanced or increasingly more sophisticated methods of measurement, (as will be applied in the measurement section of the model) that are to be used to measure the environment of the subjects in order to increase their perspective on changes that are necessary. Interactions during this segment include education of the above modules

by the facilitating group as well as interactions between supervisory and subordinate parties on the details of such modifications.

The measurement section has a twofold purpose. The first part encompasses the subject's measurement of their internal and external environment in order to gain greater clarity and perspective on their current state. This environmental measurement continues through the path that is taken towards organizational goals as progress is also measured. A second tier of measurement includes the tracking and documenting of the levels of change of the subjects included in the study to observe specific group success in making changes towards the desired intent of the initiative. This documentation includes both internal and external group determinants of change. In both tiers, measurement of the environment includes the definable and observable progressive modification of performance behavior in both supervising and subordinate parties individually, as well as the group collaboration efforts towards the accomplishment of the desired initiative.

The dual components of the model work as a driving mechanism of change in sequence initially as refined education and new measurement is assessed while change is documented. Over time, they but become simultaneously involved as they overlap in domain. Thus, the process more fully integrates measurement as a part of the education and education a part of the measurement.

The theoretical change process that occurs as the model of education and measurement is displayed in two alternate ways. Figure 8 shows the interaction between the three model elements with a description

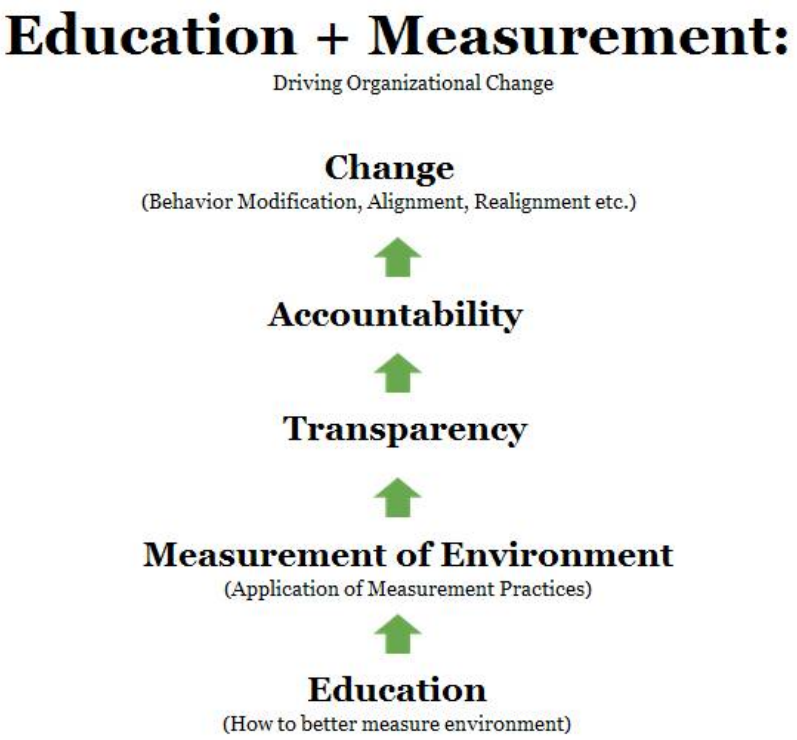


Figure 8: How Education and Measurement Drive Change

of what occurs in each whereas figure 9 displays the environmental phenomenon that are expected to occur which lead to changes in behavior among the subject individuals.

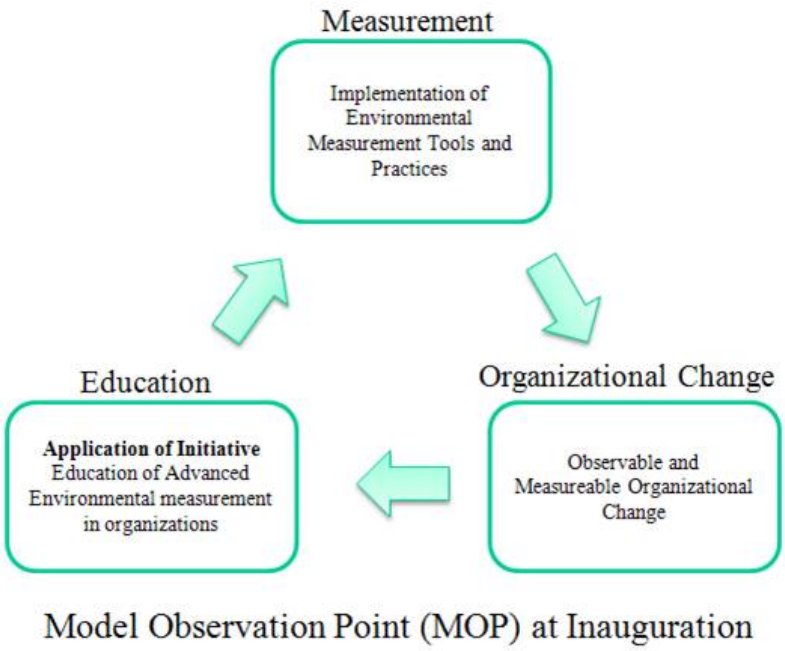


Figure 9: Cycle of Education and Measurement with Change

Chapter 5

METHODOLOGY

This work follows a qualitative inquiry enhanced with quantitative analysis of survey data. Creswell refers to this research approach as an "exploratory mixed method design" (2002). The advantage of a mixed method design is that it combines the strengths of both quantitative and qualitative methods. Qualitative data offers information about the context while quantitative data provides for some generalizability of the findings. The procedure requires that the researcher gathers qualitative data to explore a question. Secondly, one collects quantitative data to explain the relationship found between the two. Collecting quantitative data second is important to test the themes from the qualitative data because it is, in effect, formed and based on the initial qualitative findings.

Group Education

Subjects of the model test consisted of members who's organizational background spread across various demographically representations which, were not relatively critical to the hypothesized outcomes. This is due to the underlying assumption that the study attempts to go deeper than the boarders of workplaces and observe a more innate human aspect of change in organizations as initiatives are implemented and progress is measured. However, for the sake of the methodological understanding, organizations can include, (as do in this

study), non profit, for profit, as well as publicly and privately owned entities.

Of the six organizations, five are privately owned and one is a publicly owned city government. Financially, three of them are for profit, 2 are non profit and one, SRP, being a highly regulated for-profit company. Industry descriptions would classify one of the groups as a full-fledged infrastructure construction company, two as being procurement organizations from purchasing groups, another group as being the facilities management and finance members in a privately owned university-preparation school. Two of the groups are vending contractors. The one in food services and the other in digital documenting services which are managed by the same purchasing entity.

Actual observed individuals included 56 members across the six organizations representing both supervising parties, as in management or "purchasing" customers or representing subordinate parties, including key subordinate employees or members of the contracting vendors. These managers represent both internal groups within organizations as well as project management teams amongst collaborating organizations in a client-vender setting. These members were mid-level to upper level managers who oversaw up to hundreds of subordinates per manager which added up to be a managed group of over a thousand employees that were influenced by such an initiative. A classification between supervisory and subordinate groups was created in order to aid in the analysis of data

that was generated during their interactions while the initiative process was being introduced.

Initiative introduction

As a whole, the concepts, principals and processes of Best Value were introduced to each of the organization as a pilot test initiative of improving processes in the various segments of project management. These facets include methodology for subordinate team selection, extensive pre-award (or pre-construction) planning, and task management by risk reporting. Arrangements on the initiative parameters were agreed upon previous to the education process where management support of the effort was needed both financially and in willingness to cooperate.

As a whole, the education consists of various types of education tools (i.e.: lecture presentations, training videos, handed out paraphernalia and software file templates) as directed by the educating PM which both teach the subjects of improved practices in project management as well as facilitate the steps of making such improvements. Each of the segments consists of specialized measurement curriculum modules that vary either slightly or greatly from what would be considered "traditional" practices in management, thus demonstrating the change both cognitively and in practice that is desired through the initiative.

As a scheduled part of the observational test, regular education meetings between the Best Value educating PM and each party, (supervising, subordinate or both depending on the appropriate specific

goal), were scheduled in compliance with the strategic goals of the organizations. Frequency of such sessions depended on factors such as desired speed for implementing the initiative, project schedule as well as the rate of acceptance to the changes proposed. These progressive steps in the environmental measurement process were carried out over the period of up to 21 months for all six groups but varied down to as little as 10 months in duration in the case of one of the subject organizations.

During the education sessions, demographic makeup of members consisted of a third-party initiative educator as well as a graduate student recorder who both played the role of facilitators during the life of the initiative. These two typically support in the drafting, implementation and measurement of the process of measurement of the subjects environment. Groups being educated typically consisted from between 1 - 12 members. On one occasion there was a group of approximately 60 members. However, the average number of members during the sessions was 4.4.

Settings for the sessions were either formally conducted in conference rooms where access to whiteboards, projection screens and presentation equipment were available. Other less formal sessions were held on regular phone conference calls or even impromptu question and answer meetings as needed. A key purpose of choosing locales for sessions was to assure that education, strategic planning in measurement and progress assessment could be conducted at the locations.

Head PM Facilitator's role included educating on advanced methods of measurement that can be utilized in the organizational settings. This includes measurement principles, techniques, practices, tools and theory both within an organization as well as with subordinate vendors in client/vendor relationships.

The role of the assistant PM also included the facilitation of education as a supportive role but also included documentation of the progress of the subjects in accepting and implementing the processes. Recorded data variables of the educations sessions included the following from Table 4.

Recorded Items from Initiative Education Sessions	Measured Format
Attendees	Number and names
Duration of meeting	Minutes and man-hours
Key subject matter discussed (measurement, finance, etc.)	Frequency of occurrences
Progressive levels of observable change behaviors	Scaled levels of change
Reported Risks to the progress of maintaining the initiative	Issues and rankings
Levels of the relationship quality (Supervisor/Subordinate)	Number Ranking
Points of Friction between team members	Frequency of occurrences
Collaborative changes that occur due to the initiative	Frequency of occurrences
Notes and summaries of initiative acceptance progress	Prose documentation

Table 4: Education Session Recorded Data Session Types

Meeting sessions can be categorized into three different classes as listed below. Specifics of their framework makeup are given below.

1. Formalized education - Initialized education sessions begin when there is a contractual agreement with the learning organization and the facilitator. Previous to an agreement, there may be a session or two where some more general education had taken place. However, this material is not counted as a part of the documented sessions. In these assemblies, a wide range of educational material is given by the facilitator covering areas of measurement theory, case studies, practices, tests, methodology and principles as they apply to the client's needs according to the contract. The majority of this material is prepared in a set presentation format which comes from a stockpile hundreds of previously created slides along with a few new ones that the facilitator may have crafted for use specific to the audience. Whiteboards are also used on occasion during the formalized sessions to explain key points or allow for some learning members to display their knowledge of applicable points of measurement. These meetings typically involve what is considered the first and second stages of the Best Value process. Sessions of this nature typically take between 45 minutes to 3 hours depending on the learner's availability and contain between 1 and 45 learners.

2. Interactive measurement systems training - Scheduled intermittently between the formalized sessions are smaller scale interactive modules where more hands-on activities of learning take

place. These session, which last anywhere between 5 - 90 minutes, involve key team members who handle the day-to-day management of the initiative steps. A more balanced dialogue takes place between the facilitator and learners in various questions are asked and answered, methods are demonstrated and practiced, tools are actively utilized and overall concerns are resolved. As successes in measurement system practices are achieved, it is proposed that the key team members begin preparing to teach the process to others in the organization as a part of its expanded use. This proposal is made in order to promote a more active learning approach by the team members (Benware & Deci, 1984).

3. Facilitated Learning/Teaching Meetings - Meetings where the members of the initiative team conduct and carry out the assigned duties in implementing and administering the measurement systems being applied. These meetings come in the form of weekly risk reporting meetings, strategic planning sessions, emergency mitigation conferences, and other formal trainings where the initiative team conducts the bulk of the education to new and first-time members. Though there still is repeated education of advanced measurement systems, the roles of the team members and facilitator now change. The educated now become the educators in that team members, under the supervision of the facilitator, take part in the system teaching to other new members

of the expanding initiative so that they too can take part in the changes in measurement that are applied.

Education Teaching Materials

Education specifics fall into three related categories that center around project management techniques, principles and tools and their associated links to measurement. These categories, Selection, Planning and Management by risk mitigation are adapted to both purchasing modifications in as well as inter-organizational interventions.

Materials used in such interactions are twofold. The first area consist of electronic media which include the PowerPoint presentation files that are utilized, spreadsheet and word processing document templates which are created which fit most organizational scenarios as well as the on-line training video modules which reiterate the training, sequencing and principles applied with the initiative. Secondly, the "hard copy" materials are also made available in terms of training cheat sheets, textbooks, physical copies of template materials and, in some cases, test material to assess retention on theoretical understanding. This material is both handed out and made available by facilitator PM's through email attachments and password protected website video links.

Measurement

Measurement of initiative events take place in groupings of 3 differing dimensions. Thought they are all forms of metrics, they tend to vary in their relation between completely isolated to strongly overlapping

and similar. The first two of the listed areas of change are progressive in that one builds upon the other. Symbolically, the first level could be classified as a type of spectacle from which the subjects can see their environment clearer. The second level would be a type of reflective mirror from which the supervising subjects can see themselves through the eyes of their subordinates in a format that is directly tied to the progress of the project. The third measurement area is accounted as a means to follow the initial two areas as well as a more holistic and interactive view of how the group, consisting of supervisors and subordinates, are modifying their behavior based on the initiative. These three sections are categorized into a three-pronged array of measurement types and are listed as follows:

A. Measurement of subordinate parties

Classified as most basic and closely linked to the initiative technical details, this level of measurement is given as an initial part of the education process to the subjects which are generally referred to as the Performance Information Procurement System (PIPS). Elements of this type of measurement include items such as past performance surveys, submissions of the scope plan by the subordinate, assessments of risk with mitigation plans as well as the ability to plan out a project in great detail. Often, these items are measured comparatively against competing groups through a ranking process which allows for the supervising party to

perceive which of the measurements proves to have the highest rating. A more extensive summary of such measurements is given below:

Client/Vendor-related material (PIPS)

- Past performance information (PPI)
- Scope definition
- Risk Assessment
- Risk Mitigation
- Stages of planning
    - Initial simplification of plan
    - Fleshed out version of plan
- Planning Dimensions
    - Schedule based planning
        - Financial increments
        - Scope development
        - Risk assessment and mitigation
        - Miscellaneous metrics (KPI's, MOU's, SLA's etc)

The act of accomplishing these listed measurement accomplishments is recorded as a part of the changes observed which is to be outlined future chapters. Though simpler and more technically based,

these achieved measurements count as a foundation for realizing the higher levels of change which are to be documented.

B. Measurement of Selves: Mirror Metrics

As the technical layer of measurements is implemented as a part of the initiative; a crowning metric is placed as a broad tracking tool which officiates the culmination of simpler measurements and processes. This tool, known as the weekly risk report, is a simple yet comprehensive measurement component that is utilized to measure related key actions as they relate to the project goals level of efficiency. Measurements that are tracked consist of both simple and complex strings of behavior, or lack thereof, which create and exacerbate potential risks to a projects success.

The resulting effect of such a mechanism allows for the supervising party to be measured according to their own actions as viewed through the perception of the subordinate party. This measurement, which is addressed by subordinates, tends to have a mirror effect for the supervisory group which displays, in measured report form, how their relevant actions affect the progress of the project.

This mirror effect measurement gives members of a project team a rare look at the measured deficiencies of the administering supervising party which, though often times painful to observe, are essential to address in the effective management of such programs.

Frequency of such reporting is typically conducted at a weekly rate where the report, formatted in a spreadsheet electronic file, is sent out to

all key members of the supervisor and subordinate party. This report tracks the scheduled progress of the project based off of its major milestone events in terms of how the reporting is based.

C. Observable Levels of Change

Though the first two areas of measurement addressed for this study cover the basic aspects of what is considered a Best Value Initiative, this third area is introduced as a means to measure the progressive achievement of implementation of the above changes in practice. This level of measurement is the most relevant to this research effort in tracking change levels as it attempts to display observed actions that signify differences in behavior from the pre-initiative actions versus the post-initiatives.

It is this level of measurement that takes place during the implementation of the initiative which will become the key data for analysis to demonstrate varying levels, velocities, environmental factors and even predictive events of organizational change. These instances and rudiments were observed, recorded, organized and compiled by the educating PM's for analysis.

Scaled Levels of Change (Model Defined Terms)

In order to measure varying levels of behavioral change, a system of classifying and prioritizing specific change actions by members of the subject group was created in order to organize a palpable perspective on the behavior modification observed. However, as outlined in the literature

review, such an empirically-based scaling is deemed to be non-existent due to the scarcity of actual data provided measuring change. Due to this, an incremental metric of organizational change consisting of six levels of distinct yet marginally separate set of behaviors and interactions were classified and documented. This measuring scale was derived from the actual events of the 200-plus hours of observation between the subject-organizations as they attempted to internalize and formally alter their method of conducting day-to-day practices through the initiative. As the extensive review of occurred data was conducted, it became apparent that common levels practices were adopted by the members of the varying groups which were then formally noted and codified by the author in an attempt to initiate a gauge of levels of behavior that can be standardized across varied groups.

These "levels" of change create a unique and unprecedented measurement in that they are observed in real time documentation, documented across six subjected groups which are applying the same initiative and are classified by scaled levels of behavioral complexity, effort and longevity.

Level I. Perspective Transformation

Counted as the lowest level of change, this type of behavior modification draws from Mezirow's definition of an internal transformation at an individual level of perception to an altered understanding of an environment (Kitchenham 2008; Taylor 2000).

Individuals or groups of individuals perceived and believed that specific aspects of their environment were one way and subsequently had their newly learned awareness gives them an altered understanding which theoretically should lead to altered behavior (Taylor 1997). For the sake of the collection of data, the perspective transformation is assumed to take place during the initial meetings with supervising parties as they learn of the process and take steps to initiate a contracted agreement with the Best Value research team. This initial taking of steps is accounted for as a Level 1 change. However, due to the focus of this research being on actions of change as compared to perceptions, further compilation and assessment is not taken of Level 1 changes. This is further deemed as ignorable due to the existing research which has been conducted on such events.
Examples of Level 1 as they were observed by the author are listed below:

- Questioning of presented knowledge
- Insights (Initial "aha" moments)
- Enthusiasm demonstrated
- Request for further education and contracted agreement achieved
- Comprehension of risks
- Discussion of new material

Level II. Behavior Introduction

Building on the perspective transformational change, the behavior introduction involves the activation of new behavior, both from a change

in perspective and from other factors, where there was no pre-existing observation of the behavior. This change must also correlate with the desired intent of the initiative. Examples of Level II are listed below:

- Personal study of materials
- Returning for further education
- Agreeing to be in core team
- Consolidation or simplification of environmental elements
- New autonomous self direction
- Preparation for initiative-related events
- Acting out a single step of the weekly risk reporting process

Level III. Applied Process Sequencing

As a series of Behavior introductions are implemented, the sequential adherence to such introductions as learned individually or from an educating source for optimized results outlines a higher level of change. The cognitive exertion moves from a singly focused modification in behavior to a more metacognitive approach of learning in that the members of a group now think ahead of what they are doing in an effort to understand logic in what the next step is.

There is also an assumed further expansion of perspective transformation that is achieved as subjects follow a newly learned sequence in behavior where a heightened understanding is reached solely from the adherence to and practice of multiple acts in a set order. It is this

heightened set of actions coupled with the perspective change which makes progression to the next level of change more likely and possible. Examples are given below:

Initiative-related planning and coordinating

Carrying out sequences of BV PIPS process steps including completion or administration of:

- PPI's
- Risk Plans
- Interviews
- Modeling of data
- Choosing a vendor based on modeled measurement
- Other related events
- Other sequencing of steps to measure organizational environment

Level IV. Distributive Transformation

A natural progression in organizational change processes is the raising of capabilities from student to teacher were applied changes in acts as well as thought processes lead to an ability of subjects to facilitate others through the same change pattern that has recently been experienced. This is where the momentum of change initiative begins to be carried on the shoulders of the early movers of the supervising group

who now begin to focus their initiative-related efforts to educate others on the process of transformation, behavior introductions and sequencing (Cortese 2005). Examples of such are:

- Answering team questions (teaching members)
- Self training meetings with others (formal and informal)
- Teaching back to educators what has been learned from initiative experience
- Presenting findings related to BV in quarterly or conference meetings
- Friction points between members due to measured misalignment (transparent errors)
- Formally disagreeing with a superiors command or suggestion based on expertise
- Risk reporting-related steps in sequence
    - Identification of Risk
    - Assessment of risk impact
    - Creation of risk mitigation plan
    - Formally posting of risks and mitigation plans in weekly risk report

Level V. Proactive Application

This level of organizational change is observed where the subjects are able to successfully internalize the intended purpose of the change

process with all of the below four levels achieved. At this point, the initiative could be considered an implemented success at a single project level and change within the constraints of the project goals goes into a state of flux where restricting issues can be addressed and mitigated without changes in the management process. It is at this point that the subjects broaden their perspective beyond the intended scope of the supervising members behind the initiative and begin to search for other applications and innovations to further the movement towards improved environments. Examples of such are given below:

- Risk Mitigation (through subordinate-directed innovation) where a formal solution is found which reaches cooperative agreement between supervisor and subordinate parties
- Change process begins a state of flux in terms of adaptive change within the initiative goals
- Excitement or enthusiasm of wanting to apply process elsewhere.
- Actively educating other team members on areas of the initiative

Level VI. Transferred Application

- Transferring concepts and principles to other environments at work, personal life, etc.

- Increasing the initiative into another unrelated area for replication of process.
- Momentum of change increases to a flux environment of change.

As a part of the compiling of the changes observed, two assumptions are made in the accounting and collection of the instances. First, such levels are deemed as having occurred when two or more members of the group take part in the change whether separately or linked in their behavior. Second, it is assumed that change levels are progressive in that when a particular level is considered as achieved for a particular session, lower levels are also typically achieved due to the functional nature that they have accomplished.

Related Measurements of Change

Along with the measurement of levels of change in behavior, several other occurrences to change were noted to be related and helpful in understanding the process of behavior modification. Such observations along with other definitional members of the observation are here noted and given concise definitions as to their proposed meaning as they relate to this study of change.

Core Team (or initiative team members)

The assigned members of a group that take part in the planned strategic initiative to improve performance at an organizational level based

on the intended goals of its supervising members.

Supervisor (S1)

An S1 individual is any member of the observed organizational group that participated in roles of oversight to other members who are also a part of the group. These members may play the role of both supervisor and subordinate depending on their role being in between others in the hierarchy. Examples of supervisors include the purchasing project management group or individual or an individual manager over employees within that management team.

Subordinate (S2)

An S2 classification individual is any member of the observed organizational group that participated in roles under other members who are also a part of the group. These members may play the role of both supervisor and subordinate depending on their role being in between others in the hierarchy. Typically, this member or group consisted of a vendor project manager team member or group or simply a lower level employee that is supervised by others that are also included in the management team.

Constructive Friction Points (F)

Observed incidences where members in the initiative committee core team openly clash via words or measured actions based on the misalignment of one of the members compared to the initiative goals. Examples of this are where one party is in compliance with the initiative

goals and another is measurably not due to the education that has been transacted. Typically there is an observed sense of apprehension, anxiety, embarrassment or anger between the two parties. Occasionally, these events will surface to an exchange of openly harsh words. However, the friction does not rise to the point of disbanding the core team or obliterating all constructive communication.

When friction points occur, there is an observable dichotomy of team members that has been noted in the study. Individuals who are aligned with the initiative goals through displayed measures of performance are considered to be a positive and facilitating part of the friction (F1). However, those who do not become aligned with the initiative intent and are measurably demonstrated as such are noted as a negative or resistor-level friction (F2).

Collaborative Change (CC)

Observed incidences where both supervisory and subordinate members of a core team coordinate a newly directed path of behavior based on initiative goals and measured progress. Examples of this occur when a pending risk is formally mitigated and removed from the weekly risk report or another eminent roadblock to the project goals is removed via collaborative efforts of both supervising and subordinate parties.

Promotion Up (PU)

A change in an individual's scope of management that increases their responsibility, oversight of members or pay scale based off of

observed performance that aligns with the initiative. In its most basic sense, it is a promotion of a member of the core team that has been measured to be a high performer and rewarded for such measured performance.

Promotion Down (PD)

A change in an individual's scope of management that is either laterally reassigned away from the initiative environment or decreased in responsibility, oversight of members or pay scale based off of observed performance that clash with the initiative. Such clashes are often measured in the form of Friction Points.

Supervisory Difficulties (D)

Observational incidences where the supervising party acts in a way that is diametrically opposed to the intentions of the initiative. Such actions create problems which could hamper the intended progress. Though this type of event may seem irrational to record, it occurs often enough in varied past project observations as to be deemed worth noting in documentation efforts.

Survey Preparation.

Simultaneous to the implementation of the initiative process and observation, a survey consisting of 43 questions was given to members of the observed subject teams probing the environmental factors of the

following areas which related to the literature review of organizational change topics:

- Demographic makeup of members and perceived assessment of their organizational environment including:
    - Levels of previous measurement before initiative
    - Levels of trust
    - Management support of change
    - Levels of continuous learning of their organizations
    - Level of rules

Though surveys were given at varying points of the initiative process, the wording was specific to ask about typical practices outside of the initiative. Of the questions asked, 6 related to demographic and written response answers and the other 37 were listed as a 1 - 10 scaled response where two opposing spectrum choices were offered giving the members taking the survey a chance to rank the level of their environments. The survey was pilot tested with an internal department organization to assure accuracy and simplicity in content and process before being used on the six subject teams.

Surveys were administered to 21 of the members within the six organizations, consisting of approximately 52 members, via the software package Google Documents. A spreadsheet form was created with the questions listed and sent to the individuals through an email link. In each

organization, the highest ranking individual member of the team was surveyed with additional members of the group as they were able to participate.

Compilation towards Analysis

Results of the surveys were pared with compilations of the observed levels of change and other related incidents to be assessed by qualitative iterations, statistical review as well as grounded theory analysis in attempting to validate the hypothesis topics (Eisenbach, Watson & Pillai, 1999; Studdaby, 2006).

Steps for such an Analysis are outlined in Figure 11 below where the blend of the surveyed data and observed information are compared to create an understanding pattern between the two sources.

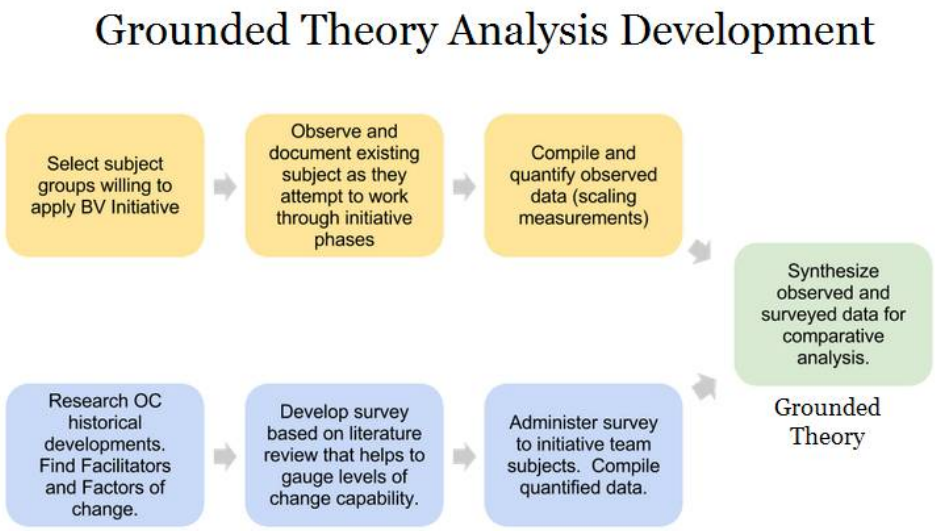


Figure 11: Grounded Theory Process Steps

Chapter 6

ORGANIZATIONAL SUBJECTED CASE STUDIES

Subject organizations that were observed with the initiative implementation were selected from a pool of clientele that were currently involved with the Best Value research group who were interested in applying the principled concepts into their workplace. Their specified industries differed widely as well as their progress within the levels of the three-phased initiative program. These variances would require a standardized observational approach which would equitably weight the progressive movement of the subjects regardless of industry or phase.

As a part of their analysis, is also helpful to summarize their backgrounds and compare and contrast the relationships of the group. Two of the groups, Fann Environmental and Orme Preparatory school, are directly related to the built environment in that they function directly with the design, construction and maintenance of structures. The city of Phoenix and SRP are closely related in that they are enormously large and carry out the purchasing of thousands vendors for support to their functions. Lastly, Aramark food services and Canon Business Solutions deal with goods and services that are completely unrelated to the built environment in terms of product, yet share the essence of what is emphasized in this study which relates to project management and change

initiatives. An overview analysis of the organizations is listed below in table 1.

Organization	Industry	PM Related	Vendor Client or Internal	Core Team Size	Observed Duration (months)
CBS	Digital Document Services	Y	VC	7	21
City of PHX	Municipal/Purchasing	Y	VC	6	15
FE	Construction	Y	I	7	10
Orme School	Facilities Management	Y	I	6	10
Aramark	Food Services	Y	VC	6	22
SRP	Utilities/Purchasing	Y	VC	5	8
	TOTALS:			35	86

Table 5: Summary of Observed Subject-Organizations

The table displays a brief analysis of each organization as they vary by industry, time period of observation and other key information. Each of the six groups were strongly tied to the Project Management-related responsibilities regardless of whether they were as a client, vendor or internal management team.

In all six subjects, the common goal of the project management team is centered on the achievement of the charted goals of the initiative. That initiative in its most sterile and simplest form deals with the accomplishment of the following steps in light of each of the subject's environment.

1. Temporarily and periodically disengage from the day-to-day rigor of managing projects in the traditional pre-initiative manner for the

purpose of initiating changes in paradigm that will better optimize the subject's environment.

2. Analyze the current environmental practices and principles and consider their effectiveness while proposing modifications that may add to the efficiency of the processes.
3. Create a plan based on the above consideration which details the dimensions of time, cost and qualitative response which are aligned with the intentions of the project intent.
4. As a part of the created plan, address and prioritize risks in process that can potentially thwart the intent of the plan. Then create plans for each of the major risks and how they can be thoroughly mitigated.
5. Formulate and introduce quantitative and qualitative measurements of such details which can effectively manifest the achievement of such a plan.
6. Regularly review the effectiveness of the plan by measuring the risk deviations weekly, applying mitigation processes to the risks.
7. At seasonal intervals, adaptively modify the plan course towards more effective methods and deliverables.

As a common goal across all groups, project managers within the observed organizations were all challenged with the accomplishment of the above steps throughout the period of the observations. This is easily

visible in the observance of their actions as they grapple with the triple constraint items of time, cost and quality of their given projects.

The proposed goal of this observational research is to apply a scaled metric across the diverse organizational pool of the six subject groups which can accurately document and gauge progressive levels of change as the subjects attempt to align themselves with the initiative at hand. Such alignment points, also referred to as "learned organizational change", are expected to become the fundamental data points and building blocks which will help to define the results of this study.

Subject Organization 1: The Salt River Project

Being the third largest power utility in the country, the Salt River Project (SRP) has a twofold mission of supplying both power and water to the Phoenix-Metro area. This mix of supplies is attained through the utilization and reclamation of several hydroelectric dams in the surrounding mountains from the valley area as well as a massive network of canals which direct the river water to the surrounding cities within the desert region. SRP was originally organized in 1903 for the purpose of providing water resources to what is now the Phoenix area. It is referred to as a shareholder owned company but is heavily regulated due to its highly integrated dealings with the public sector.

Based out of Tempe, SRP is one of two power utilities in the valley and employs hundreds of administrative and utility workers over 2,900 square miles of land and carries a gross revenue of over $2.5 billion per

year for all of its services. As a buyer, SRP relates to any other business in that it purchases items for office, fleet, real estate and other goods and services. However, because of its state and federal regulations it has specific and strict guidelines on the procurement process that emulate government standards in purchasing.

The subject-group that was observed within SRP was a set of two procurement teams which handled the purchase of two distinct and different products; One in demolition and recycling services and the other in digital documenting services. The first was the solicitation and selection of a demolition contractor to take down, remove and salvage an antiquated steam plant building which was on the property of the company. This type of procurement process was to be run off of the Best Value model using the education of advanced metric techniques in measuring the predicted value of each bidding contractor. This type of initiative, helping a buying organization utilize advanced measurement techniques to more efficiently procure, is the most common procedure that the Best Value team facilitates. It has been replicated in hundreds of similar trials and is considered standardized and streamlined.

Each of the teams consisted of a solicitation manager and a technical operations manager. Other administrative assistants were also available for the procurement team during the review of bid packages as well as interviews. Solicitation steps in the new initiative were conducted fairly smoothly and without incident through the presolicitation meeting,

writing of the request for proposal (RFP) and up until the pre bid meeting. A walk through was carried out during the pre bid meeting where the key question was asked by the contractors about possible asbestos in the existing structure. This issue was brought up in the pre solicitation process and the answer was unknown as to the amount or locations of asbestos. What was known at that time was that SRP had received an informal estimate on the project several months prior which supposedly included the cost of abatement of asbestos. As this issue came up again during the official solicitation period, SRP opted to let the contractors "bid it as is". The resulting bids came in from vendors both in the state and a few environmental contractors from other parts of the country. The measurement initiative methods proved to be able to narrow down the bidding to a few vendors for interviews and a final modeling of the measurement data to make a single vendor selection.

It was at that point of the solicitation process that the upper management of the solicitation, members not included in the solicitation process, balked at the results. While SRP was under the impression that the cost of the project would come to about $60,000, the actual bids were closer to $200,000. This caused approximately three weeks of delays where all vendor parties and the research team were put on hold. In the end, SRP decided to cancel the solicitation and wait until further funds could be allocated towards the work in the future.

The second project involved the solicitation of a more unified digital documenting service that could cover the full administrative offices of SRP. The same initiative-based model of education and measurement was given to the procurement team to aid in measuring the bidding vendors towards a selection. However, the members of the team were completely new, due to the change in industry being procured. Ironically, a similar event resulted from the solicitation. Close to a dozen vendors were measured and the list was narrowed down to three. Interviews followed the initial measurement phase and a single vendor was easily decided on from the scoring process. At this point, however, during the "pre-award" phase of the process, upper management from SRP began to express concerns about their willingness to continue with the award. As the details of what was to be required from SRP began to be fleshed out by the vendor, which included consolidation of printers, measurement of paper use by each individual and other areas of change, the executive level of the company began dragging its feet in the final authorization of awarding the contract. Up to six weeks were spent where the highest ranked vendor was in a type of limbo preparing the contract schedule and details but not getting any notice to sign documents. At that point, relations began to break down between the two groups where it became increasingly apparent that SRP was not going to make a decision any time soon.

Though uniquely diverse in application of the initiative model, it is worth noting that two common events occurred in each of the scenarios.

First, the use of education and measurement were able to clarify a vendor which was most aligned, within the cost and scope constraints of the client, to the project at hand. Both procurement teams agreed that the ideal vendor was found and showed enthusiasm over the process being effective. However, in both cases, the clarity of vendor election made it more noticeable that the buyer's upper management team was not behaving in a rational and consistent way with the intent of the solicitation. Upper management's lack of preparation in job costing, by relying on a passing vendors estimate, and indecisiveness in a digital documenting change became transparent through such a measurement system.

Though not directly related to construction topics, the fact that the same model of measurement and education was utilized in the solicitation is highly relevant. This key linking factor helps to bolster the concept that the practice of applying education and measurement to organizational environments towards an initiative is not just a construction or documenting service issue alone but an issue of organizational practices across industries. More succinctly, it is a matter of human behavior and interaction with organizational change initiatives.

Ironically, the procurement process for the delivery system to be applied was identical in measurement steps and deliverables. A succinct example of how two vastly different industries can be laid in parallel

comparison to having very similar deliverables in order to demonstrate measured performance between competing vendors.

Subject Organization 2: Orme Preparatory School

Founded in 1929, Orme School was named after its founder Charles H. Orme who created the private school for the purpose of giving a good education intertwined with a setting of family-type responsibilities where each student is to contribute to the duties towards community. Located about an hour north of the Phoenix metro area, the school sits as a 320 acre campus in the backdrop of the Prescott National Forest. Employing approximately 60 administrative, faculty and staff employees, the school maintains a student population of about 120 students who come from the US and 16 or more countries across the world. The campus of the school consists of several living dormitories, a full service cafeteria, classroom buildings, religious edifices as well as the ranching and other extracurricular facilities. Over 80 buildings, water and wastewater system

Though similar to other private boarding schools, Orme has gained unique notoriety for its excellent college preparation courses as well as its applied work responsibilities given to students (in the Orme Community and with the adjoining ranch) with a strong Horsemanship program and other needed tasks on the campus. This "country western" mix of features has made it an attractive place for parents seeking a unique and fulfilling experience for their children while attending primary and secondary school.

Though the school had enjoyed decades of success, the past dozen or so years showed steady signs of decline in student body, facilities condition, tenured stay of teachers and (most importantly) philanthropic donations. Board members governing the school function had recently caused a shakeup of some of the head employees and its headmaster due to the declines. The board's hope was that a new leader could help to "right the ship" from its decline.

At the time, the biggest concerns with the school were financial. Several accounts payable items were in the dozens of thousands in the red and the staff repeatedly needed to request "emergency funds" from the school board to cover the repeated overhead cost of payroll. Worst of all, the school leadership really didn't know what their financial situation was due to incomplete records kept by past staff members. This financial strait also was closely related to a second major concern of employee morale. Rumors that the school was operating at huge losses circulated for a number of years and the fate of the school's future rested in the hands of the board.

A year following this shakes up, Jeff Sawyer, the research change agent was asked by the headmaster to join the group to help with finances and other management areas in a continued effort to improve the school's current standing. Though Sawyer was a current employee and part owner of a specialized construction company, he saw this opportunity to change his path in life as well as a chance to apply a Best Value model of

management, one that he had been working with for a few years, in this new and complex quandary to test its ability to improve the environment of management efficiency.

The core team that was observed with the initiative implementation consisted of eight members. These included the Jeff Sawyer, the Business Manager (Essentially chief Financial Officer and director of Facilities Management,) the Headmaster, Asst. Headmaster, Dean of Student Life, Academic dean, Director of Horsemanship, Director of Summer Camp, Director of Development, Director of Admissions and a couple of other administrative members.

Due to past experience in the initiative concept, Sawyer was able to conduct his own sessions of education to the key core members of the group in order to help them gain a understanding of the advanced measurement techniques. Several sessions were conducted with him individually as well and one session with the Headmaster. Emphasis was placed on implementing the weekly risk reporting tool which required extensive education on risk, mitigation procedures, planning and scheduling and the format of the report.

As a part of the risk management procedures, Sawyer headed up the creation of specific strategic plans of the school which addressed all major components of the schools goals. These plans, which addressed financial, marketing, facilities and operational goals, needed to be formalized and presented to the school board of directors for approval. Following

approval, implementation of such plans was conducted in order to fulfill the newly desired direction of the organization. Then, and finally, the measurement of such plans is compared to its actual implementation compared to the plans which were created.

As the education sessions continued with the implementation of such plans, the group began silently split into a few groups. First, there were those who were willing to follow and comply with the new procedures, other groups visually supported the changes but did little to nothing to support it and finally, a third group which seemed neutral to the changes but secretly opposed and resisted the changes. Over the period of the 12 months of observance of the initiative, it began to become openly visible of the three types of groups as they related to the process. As individuals did little to nothing to mitigate risks, their names and titles came up more frequently during regular meetings and informal conversations of "who was responsible for what". These individuals thus became more combative towards the initiative as well as the change agent himself.

Though the relationship between the change agent and the combative employees was ongoing, what became more of a challenge to the initiative goals was the response of Sawyer's supervising Headmaster. As the risk reporting framework began to pile up issue after issue on specific employees, Sawyer attempted to confront his superior on the issues by sending memorandums formally and conducting several

informal meetings. The Headmasters response was consistent in that he promised to deal with the individuals and such issues. However, over the months, no known supervisory intervention was enforced. As time went on, the same individuals were documented as participating in unethical and possibly illegal activities which were considered nepotistic and even detrimental to the schools income source.

There came a point at approximately nine months into the observations where the inactivity and lack of action of the supervisor superseded the measured risks of the specific employees. It was at this point that Sawyer began to realize that the lack of change in the combative employees was not as much of a change issue as the lack of change in upper management to act upon the data that was transparently showing the areas of failure amongst subordinates. To the credit of the headmaster, it should be noted that he had suffered from a health condition which required the use of strong prescriptions which may have affected his memory and personality. Regardless of the sources of such behavior, frustrations continued to mount to the point where Sawyer realized that no change was likely to occur in the organization because the Headmaster would not address the problem areas that were being made transparent.

It was at this point that Sawyer had to decide what he was to do with such information collected about the organization. If he reported directly to the board, he risked losing the trust of his headmaster who was

also considered a friend. There was even discussion of him potentially losing his job for doing such a thing. However, if he continued in the status quo of transparently seeing such poor and improper performance in his work, he found it increasingly difficult to contain the truth.

Finally, during the twelfth month of the education and measurement initiative, Sawyer flew out to California to discreetly meet with two members of the board and express his documented concerns of the situation at Orme. The board members that visited with him expressed their concern with his being discreet but understood that it he was willing to take the risk and fallout of such a decision. The following morning after the meeting, Sawyer and his wife, who was also employed at the school, were called into the headmaster's office. They were both promptly fired with a small severance package and asked to have their belongings removed from their offices that day.

Subject Organization 3: City of Phoenix

Being the purchasing department of the sixth largest metropolitan areas in the U.S., the city of Phoenix encompasses a population of just under 1.5 million over an land area of just over 500 square miles. Since its incorporation in 1881, the area has enjoyed continual growth and expansion which has been, in part due to its mild winters and advances to air conditioning technology.

With such growth it has historically outpaced the national average growth rates consistently for the past 18 years and maintained an S&P

financial rating of AAA. Its annual spending budget was at $3.47 billion while the total marketplace commerce of the area comes to $181 billion. However, it must also be noted that recent downturns in the economy have hit Phoenix among the hardest of large cities which have taken some of the luster off of its successes.

Within the purchasing department of the city, this observed test of the education and measurement model was applied in the procurement of recycling services at two of their Material Reclamation Facilities (MRF). These services included the collection of public recyclable wastes, separation and packaging of reusable materials, and the profit sharing of the sales of such recyclable contents with the city of Phoenix. It was estimated that such a contract would recover several millions of dollars of shared net income per year. With an existing contract which had been already in place for a number of years and the city wanted to rebid the project in order to demonstrate the competitive opportunity for other vendors. Also, packaged in the bid process, city officials hoped to gain a clearer contract which will add greater value to the contract benefits for both the purchasing and contracting parties.

The core team of the initiative included a manager of procurement, and few engineers that were related to the technology and processes of reclamation, a director of operations at the plant and a couple of administrative members who attended the sessions for educational purposes. The procurement team was educated in the normal fashion of

learning advanced measurement processes which aided in the selection and project management stages.

Through the initiative process a highest ranking vendor was selected, which happened to be the incumbent, and preparation was conducted to prepare for the contract signing. During this period, two notable delays occurred which lengthened the process. First, the city council, which needed to make final approval of the contract, adjourned for the summer which caused approximately 2 months of delay in the summer months. Secondly, a rival bidder on the contract threatened to contest the process because of unfair advantage being given to the incumbent. Such protests could slow down the award process and even, at times, require a rebid or cancellation of the project if the claims uncover improper protocol from the procurement team. This potential delay turned out to be a non-issue because the competing vendor opted not to pursue the claim.

As the MRF contract was in the final stages of planning and coordinating before signing, another notable event occurred which potentially affected future initiatives. A new mayor was voted in to office of Phoenix which brought in a new regime of leaders and philosophy. The previous mayor had a vested interest in the process and issued a contractual relationship with the research team. Yet, with the new mayor, it was unclear during this period of transition whether the research would continue past its single contract trial. Along with this regime change at the

highest city level was a cascading effect of position switches in the core team. With the mayoral change, each of the team members with the city either moved to another place of employment or was reassigned to other areas within the city. This would in turn require the new series of training with the new team, if there was a continuation in contract.

In the end, a renewal was agreed upon and a second procurement with the Best Value initiative was begun in a completely separate industrial field of Phoenix towing contracts with a new team to educate. This contract consisted of the towing services of a single company for all accident cleanup and other automotive removal circumstances within the city limits. Though vastly different in its component makeup, the procedure for educating, procuring and measuring was fundamentally the same which consisted of teaching methods of measuring vendors capabilities as they fulfill the needs of the city and helping the highest performing vendor to measure themselves in the management of the project of towing for the city. Before the selection and project planning could take place, the period of this research and observation collection ended with the city.

From the initial education with Phoenix until the end of the observed period of this research, the education period lasted 14 monts. This included all education sessions on measurement techniques and applications through the solicitation, selection, project planning and initiation of the MRF project as well as the education and approach to

selection with the towing work. A third procurement with auctioning services was also in the preliminary phases of development.

Subject Organization 4: Aramark

Being a provider of food services, facilities management, industry apparel as well as other industrial services, Aramark (AMK) has consistently been considered to be recognized as a top tier organization for more than a decade. Headquartered in Philadelphia, AMK employs approximately 255,000 employees across 22 countries in the world and has consistently ranked as one of the top and most admired companies by FORTUNE magazine and other peer & analysis-voted publications over the past decade. With a multi-industry emphasis on excellent service to its customers, AMK also seeks to be a proactive vendor to its clients by focusing on current issues of employee advocacy, environmental awareness, and involvement in the community.

Within its dining sector, AMK services over 600 institutions in the North American continent by providing food services for residential dining, retail management of operations, kiosks and other restaurants typically found on educational properties, recreational sporting facilities and other event centers. It is on one of these Universities that the observed initiative took place for this research.

AMK's vendor-client contract between Arizona State University (ASU) for food services on its four campuses throughout the Phoenix Metro Area. The ASU organization consists of over 70,000 students and

roughly 12,000 faculty and staff members over a span of four campuses, 17 internal colleges and over 200 serviceable buildings. The university is one of the top three ranked universities in the country in terms of on-campus student population. The contract was originally created through the Best Value process of solicitation, procurement and project management making its contractual framework to be well aligned with the elements of measurement. Due to the size of the university and its supported population, this contract was AMK's largest account in the world accounting for well over $20 million in revenues per year.

The team that was involved in this consisted of about ten individuals from both AMK and ASU. These members consisted of a head representative from each party, an assistant head, and a chief financial representative. Beyond that, ASU had higher ranking executives who would periodically join the sessions as well as a few administrative and legal council members on both sides.

AMK had won the bid against an incumbent vendor on campus which had held the contract for several decades. At the beginning of this observed research, the agreement was currently in its fourth year of a 20 year term for supplying such goods and services. Though it was very much intact and functional, the agreement had contractual segments that were not being carried out in alignment with what was originally framed and were, thus, in need of modification. Therefore, it was anticipated that

through the model of education on advanced measurement procedures the necessary improvement could be accomplished.

Actual sessions had begun occurring multiple times a week lasting for up to over an hour each. As education of the measurement process and techniques was given over the months prior to and after signing of the contract, the quantity of time spent was streamlined down to weekly phone conference meetings where contract progress was outlined and risks to the contract success were being reported at a regular basis. During the first year of the observed meetings, which was actually the third year of the contract, the length of these weekly meetings was between 15 - 30 minutes long and mostly covered current risks being analyzed and mitigated. As the meetings progressed over the 12 months, it was periodically considered to have the sessions be reduced in frequency from weekly to biweekly or even monthly. At approximately 1 year into the observations, session schedules were formally reduced to become biweekly and shortly after were reduced to an "as needed" basis for a period of about nine months.

It was during this "as needed" period that a simultaneous change in leadership took place with both heads of ASU and AMK teams. These leaders were reassigned to other posts within their organizations and other members were promoted into those positions. Because of the new leadership, further formal education sessions were implemented with the

new members as well as their subordinates to additionally help the team to better align themselves with the requirements of the contract.

Subject Organization 5: Canon Business Solutions

Canon Business Solutions (CBS) is part of a national structure known as Canon USA. This, in turn, is under the multinational conglomerate organization, Canon Japan which is based out of Japan. The entire company consists of just over 11,000 employees and has regional offices in every major metropolitan area in the US. In the field of digital documenting services, it competes with other companies such as Hewlett Packard, Xerox and Ricoh (Hoovers, 2010). On the university level, CBS has held several contracts with schools where multifunctional devices (MFD's) and services are provided on a sales and maintenance basis. In this particular case, an agreement was made to provide services and goods to Arizona State University (ASU) with the unique twist that the agreement was made as a long-term alliance agreement which would last up to twenty years with five-year incremental checkpoints.

The ASU organization consists of over 70,000 students and roughly 12,000 faculty and staff members over a span of four campuses, 17 internal colleges and over 200 serviceable buildings. Ranking within the top three largest schools in the U.S., ASU's copy and document needs would cover the oversight of thousands of machines and several million unit copies per year (Arizona State University Publication, 2010). Interlaced among this scholastic structure is a framework of various campus software networks

and databases from which the multifunctional documenting units would be digitally linked for digital tracking of “clicks”, repairs and networking.

The setting for the CBS initiative observation takes place at Arizona State University, where an exclusive rights contract between the two organizations was signed, attempted and had failed miserably to the point where it was terminated. The general terms of the canceled agreement were that ASU would provide the campus venue and clientele with digital documenting needs and CBS provides the services, equipment and network infrastructure to service their needs. Key elements of the failure seemed to stem from ASU’s inability to enforce a single vendor use on its many campus departments and CBS seemed to struggle with going beyond the mentality of “selling boxes” of units to become a more full service provider of digital documenting services. As the details of the contractual divorce costs were analyzed, the two parties decided to give a last effort to see if such a model of measurement and education could be applied to rescue a dead contract. ASU had worked previously with the research group on making contractual improvements in solicitations and had hopes that such improvements could be made at a more substantial level with this dilemma.

Due to the complexity of such a contract and the soured state of the relationship of the two parties, the starting point and goals of such an initiative was much more intricate and vague. However, the opportunity to document several solid baseline measurements and track the changes in

individuals was an ideal setting to observe how elements of education and measurement were able to effect organizational change.

Over the observed period of 5 months the two parties had agreed to put the contract into a "safe mode" of status where transactions could still be carried out in a simplistic manner but the total contract would be under reconstruction. During this period, bi-weekly education sessions were held with 5 - 9 members of both ASU and CBS representatives. Members from the CBS side included a national accounts administrator, a regional manager, a local sales personnel member who handled the campus account, an operations manager who would help to manage the day-to-day maintenance of the equipment and an occasional international manager. On ASU's side, a single ambassador liaison was present for almost all sessions, as well as a contract administrator and an occasional assistant vice president would attend in order to review the progress. From this phase of the initiative, the contract was able to be redefined based off of the successful application of the newly educated measurement practices. During this period, the successful salvage of the terminated contract was accomplished.

Following the salvage and signing of the alliance contract, a second phase of the initiative was applied where the newly created contract elements needed to be administered through the same model of education and measurement. This observed period lasted a total of approximately 18

months where the use and intent of the model was changed from contract salvage to contract maintenance through measurement.

Interestingly, as this phase began, the challenges that each party had faced from the past shifted from the buyer-vendor relationship to a more internal struggle of maintaining what was promised in the delivery. ASU's struggles of being a bureaucratic and complex organization were addressed and planned for fairly well. Occasional issues, referred to as risks, were regularly addressed and grappled with until favorable solutions could be worked out. However, on the side of CBS, contract requirements that were initiated by their own team became a recurring source of frustration. In essence, CBS was changing their traditional way of approaching university management from a supplier of goods and maintenance services to a more holistic consultant of sustainable solutions that both saved departments both funds and was environmentally friendly. This required change in systems became one of the single most recurring points of discussion and friction in the initiative where internal politics and bureaucracy needed time to play out their course.

By the end of the observed period with CBS, a total of 23 months progress was documented with actual meeting minutes and members involved. The contract was successfully brought back online in an almost completely revised format known as a "super amendment". Even more substantial is that the revitalization of the agreement was that it was able

to run continuously for a period of 18 months with no previous signs of cancellation as it had done before.

Subject Organization 6: Fann Environmental

Fann Environmental (FE) is a partner-owned public utilities construction company based out of Prescott Arizona. They specialize in the design, construction, maintenance and operation of public water and wastewater systems with various municipalities around the state of Arizona and surrounding states. Their ownership and management team consisted of five members with an engineer/project manager, two superintendents, two administrative employees and approximately fifteen on-site skilled laborers. FE was initially created from a road construction parent company, Fann Contracting, Inc, with the intent of diversifying its capabilities. However, FE was considered an autonomous and self directing entity where the appointed management team was given freedom to govern itself (and had different ownership).

The company was organized in 2005 by a partnering agreement between a few of the management parties who wanted to pursue specialized contracts in public water works in small-to-medium sized city and state government projects. The market niche that the company followed in work was to cater to their clientele needs in building and maintenance of facilities at the smaller levels yet is able to compete with the larger, national public works contractors by utilizing geographical advantage as well as smaller overheads. Yearly gross income for FE ranges

from $6M - $12 million and continued on a trend of growth since its inception.

The core management group who were part owners of the entity consisted of the president, the Vice President/chief estimator who also handled project management and finance General Superintendent, Project Engineer, the head accountant and a Project Manager. These members met periodically and made company decisions on finance, marketing, office procedures, bidding pools, project management issues, human resource questions and other areas of administration. Interactions with the other two administrative employees were also high with this group which allowed for their inclusion of the observed interactions to be accounted for in the study.

The part owner-VP from FE, named Jeff Sawyer, was the key contact with the research team. Their meeting took place through a state park restroom and wastewater treatment plant design build project that was procured and managed using the initiative process known as Best Value. In the solicitation sequence, FE was able to win the bid for the project and became intimately familiar with the process through first-hand experience of the project, which lasted approximately Two years.

During the period of the project, Jeff began to further inquire about how the Best Value principles and practices that lay behind the initiative applied to other client-vendor relationships as well as other settings. From his project-applied education and further discussion with the

research team members, a conceptual framework was outlined where the initiative process could be applied internally with FE which would attempt to improve its organizational structure and management process by implementing greater levels of internal measurement practices through educating the members of the team and measuring the progress of such an initiative. As a part of this framework and process, Jeff would be considered the "change agent" or "change manager" in that he was to be the owner and driver of the initiative.

Initial education sessions were initiated by informal meetings with Jeff and the members of the core management group from which the model concept was introduced and agreements were made to receive further formalized sessions. From that point there were multiple meeting sessions with Jeff and two formal sessions given to the core group where the basics of the process were outlined and plans drawn up for expanding a customized measurement system.

Elements of the plan consisted of the following sequence of items listed from the session notes taken:

- Benchmark survey company to test changeability
- Educate company members on theory and organizational changes (what, why, how)
- Job description assessment process (work plan write-ups, interview, etc)

- Formulation of scope/employee job description and establishment of metrics to be able to measure and track employees work.
- Begin measurement of hours based on time spent on tasks.
- Begin the makings of a periodic Directors Report based on time and other metrics.
- Start to blend measurement of time/tasks with metrics established with employee scope.
- While blending items in #7, begin educating and implementing on the risk reporting system (risk management).
- Education, education, education.
- Continued tracking, streamlining and simplifying of the process and the directors report.

Along with the plan were a set of tools developed including an initial schedule of initiative implementation based on the upcoming months, customized spreadsheet templates that would be utilized to track hours listed to each company job as well as a separate template to track and mitigate weekly assessments of risk. The hours-tracking template was a new addition which was aimed at simplifying the current complex and cumbersome system of allocating employee hours to current job projects. The other weekly risk tool was a modified Best Value tool known as the "weekly risk report" which would allow for the measurement and documentation of internal operations of the company.

Visual and verbal response from the formal training sessions was varied anywhere between quietly attentive to verbally and visually enthusiastic. There was no discussion or doubt given as a response to the education. This response was taken at face value and seemed to imply acceptance and potential success in plan implementation. This positive response from the group, however, was the last documented level of change that was observed.

Implementation of the hours tracking tool is where the first signs of difficulty were displayed. A lengthy education session on the template and method for inputting hourly records was given to the administrative employee to fill out daily. Over the next weeks, several checks of the template showed that the form was not filled out or used. A similar response took place to the other weekly risk report tool which, after several hours of preparation and training on its use, fell to the wayside.

Chapter 7

DATA COLLECTION AND CHARACTERISTICS

Data collection for this research consisted of two primary sources. First, there was the information from individual observation and annotation of occurring events. Secondly, surveyed results were drawn which originated from key members who were subjected to the initiative tests of management. Within this pair of sources lies several subcategories, technological elements and characteristics of the collection process that are to be covered in providing a description of the scholarly application of a model of change test.

All meetings that involved the supervisory and subordinate parties where education and measurement were administered in which real time interactive discussion took place were recorded over the span of the observation period of each subject group. This included a majority of face-to-face meetings and phone conferences with a rare, yet occasional email with a string of communications as they were decided to be relevant to possible change factors that were taking place. Such emails consisted of less than 10% of the sessions recorded.

The recording method was organized through the use of presentation software to outline the historical progress of the members. However, after approximately three weeks of collecting data in this manner, a newly devised system of recording was organized with the use of

the survey forms option found on Google Docs. A sample screen shot of the form used is shown in Figure 11.

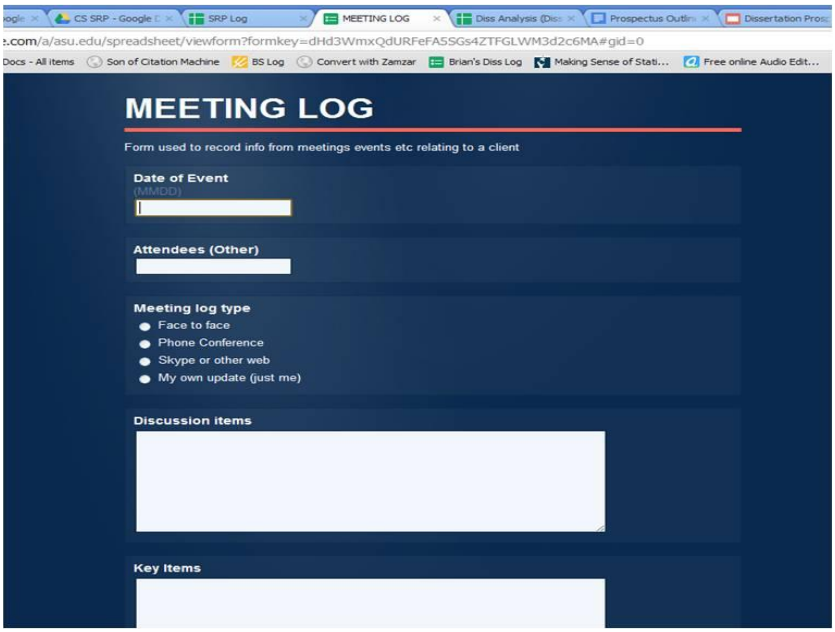


Figure 11: Google Docs meeting Log Form

This change in data collection method was made to facilitate the process of collection of the massive amount of data that was being collected. Forms were created with specific questions and spaces for note taking which were then used as electronic notepaper for the creation of the observed events of the study. This had the benefit of being easily compiled, as the surveyed information was automatically registered in spreadsheet format in the off-site cloud-database and mobile in that information could be input and accessed through any computer device that had Internet access. A separate form was created for each of the six subjected groups with the same set or recorded data items. Recorded

events and other figures were then compiled into a single spreadsheet file where they could be further analyzed.

Form-based questions, outlining the recordable evens of each session, had an array of data points that were collected from each session consisting of numerical, categorical, list, prose and summary information as described below.

Observed Education Session Data: Defined Terms per Session

Session type - Sessions were recorded in personal meetings where more formal education and change facilitation was transacted or phone conferences typically involving three or more people. A small percentage of the sessions comprised of emails or conversations that were carried out via email which were equated to the accomplishments of an education session.

Date - Time and date stamps were listed at the moment of the input of information. This also may include the span of time.

Attendees - Names of those in attendance were noted at the beginning of the session.

Meeting Duration - At each session, the number of minutes was taken within a 15-minute increment scale where figures were rounded up to the nearest increment. As sessions were less than 15 minutes, actual minutes were input.

Discussion items - Main body of notes, quotes and overall progress towards initiative changes listed. All notable details of the sessions were

accounted for further review and analysis.

Key Items - At the end of each session, a simplified summary of the session was listed in a single sentence for quick reference.

Action items - Commitments or agreements that were made which, if kept, could be accounted for as a part of the scaled changes that were being tracked.

Summary of observational items - Written information of the discussion, key and action items consisted of 123 pages of prose wording in a 12 point font which included 5,593 lines of text a 54,079 words written. These notes were the primary source of the qualitative data and the quantitative events such as levels of observed change, friction points and collaborative change.

Risks to Report - Risks were recorded as perceived in observation during the session. These explanations were given of possible actions which could potentially derail the desired changes that were needed in accordance with the initiative.

Level of relationship (1 - 10) - A general ranking between 1 - 10 was given after each meeting by the observer to rate the level of good will that was apparent between supervising and subordinate parties.

Observed Iterations Defined

Friction points (F):

As defined in the methodology section, friction points (F) were recorded as observed and annotated binomially as a per session basis.

Compilations of frictions points were arranged so that the totals of sessions with friction points were listed as a percentage of the total number of meetings. In each of the notations of friction points, a minimum of two individuals were identified and tracked as having been a part of the dichotomy of friction members. This dichotomy consisted of an individual who was aligned with the initiative measured objectives and the other individual(s) who were not aligned or in compliance with the measured objectives.

Detrimental acts by management (D):

As defined by the methodology section, Detrimental acts (D) as observed in the supervisory behavior were recorded as observed and annotated binomially as a per session basis. Compilations of sessions with detrimental acts were arranged so that the totals of sessions with such acts were listed as a percentage of the total number of meetings.

Collaborative change (CC):

As defined by the methodology section, collaborative change (CC) as observed in the supervisory and subordinate behavior were recorded as observed and annotated binomially as a per session basis. Compilations of collaborative change incidents were arranged so that the totals of sessions with such changes were listed as a percentage of the total number of meetings.

Change Levels (L#):

As defined by the methodology section, Levels of change (L1 - L6) were observed and annotated as a per session basis. Highest levels of behavior changes L were accounted for in each meeting as being achieved. Due to the progressive nature of the scaling of L, it is given that lower levels of L were achieved, yet not noted per meeting. Compilations of the noted change levels were arranged so that the totals of sessions with such designated levels were listed as a percentage of the total number of meetings.

Transformative Changes (L1)

L1 Changes were acknowledged but not annotated due to its indirect observational qualities. Deriving from the transformational learning origins, the existence of a change in perception is assumed to have taken place as a foundation where higher levels of change can be performed. Therefore, analysis of such occurrences was not included.

Simple change levels (L2 & L3)

L2's and L3's were considered to be simple changes as they involve going through the motions of initiative as are taught by the facilitators, but not showing any signs of momentum towards self directed and proactive change towards such a cause.

Complex change levels (L4, L5 & L6)

L4 - L6 changes build on simple changes but are observed to come from within group members as they take on higher levels of alignment of

initiative goals by teaching others about the change cause, interacting with other members collaboratively towards the cause and finally transferring learned changes into other environments beyond the boundaries of the initiative to replicate the process of the change elsewhere.

Promotions Up and Promotions down (PU & PD):

As defined by the methodology section, promotions of individuals as up or down (PU or PD) as observed in the supervisory behavior were recorded as observed and annotated binomially as a per session basis. This was also recorded throughout the period of observation as a whole for further analysis. This included the tracking of the total number of observed individuals for any known changes in the individual's responsibility scope as defined in the methodology section of this research.

Organization Status Rankings:

A simple ranking of change progress was given to each subject as classified between three levels including excelling, maintaining or failing at the change initiative effort. This system of classifying the groups was added as a simple and quick reference as defined by the author's interpretation of the client's seeming progress in adapting to such new processes. The intent of such ranking is to give an added layer of comparable measurement to the iterations of the subject's ability to successfully manage change.

Compilations of Data

Time summary

In total, there were six organizations observed over approximately a 21 month period. Individually, the observation periods varied between 7.8 and 21.3 months. During this period of time, 282 education sessions were conducted where various levels and related characteristics of change were recorded in a real-time basis where an IMOP time frame was applied. Average length of each session totaled 1.1 hours per session and individual subject groups varied in session time from .7 to 1.5 hours per session. Total session in actual time was 223.8 hours. Attendees to the session's averaged 4.4 people per session giving a total person-hours invested time of the research to be 1,268 hours of face to face, phone conference and email meeting sessions.

Assessment and standardization of change data

Compiled components of D, CC, F and L's were given standardization by applying their values based of the number of total sessions as well as hours of education time. This allowed a standardization of numbers which took into account the number of sessions as well as the number of minutes/hours that the sessions took across the six subjects. From this application, various ratios were created that now became comparable across the six organizations based on the volume and frequency of the education periods. These comparable ratios became the basis for the analysis between organizations as well as across

the several other standardized measurements which were used in comparison, correlation and the chi squared null hypothesis testing of such data. From this compilation technique, various rankings of change levels, friction, collaborative change and detrimental acts of management could be accounted for in a comparative format between the six subject groups. A summary of the ratios derived are as follows:

Average Simple Changes per hour:

Number of simple changes that occurred, L2 – L3, divided by the number of hours of education as summarized in the total minutes of session time. A range of coefficients were yielded from such a measurement ranging from .99 and .13 between the six organizations.

Average Complex Changes per hour:

Number of more complex changes, L4 – L6, that occurred divided by the number of hours of education as summarized in the total minutes of session time. A range of coefficients were yielded from such a measurement ranging from .67 to 0.0 between the six organizations observed.

Weighted Changes per hour:

A compilation of the simple and complex time-based changes that were formulated to create an overall change ratio per subject was created. Because of the greater interest in more complex levels of change, a higher emphasis was placed on the L4 – L6 types of changes (90% complex weighting vs. 10% weighting) in order to more heavily reflect such events

and avoid the over influence of simple action changes in behavior. The desired effect was to display internal and transformational change actions as compared to simpler acts of just "going through the motions".

Overall Change Rankings (OC):

Ranking subjects from highest to lowest in terms of their levels of observed change coefficient. This figure is derived by taking the total number of L2 – L3 as a coefficient based on the changes found per hour coupled with the L4-L6 coefficient derived in the same manner. The simple change coefficient is multiplied by .1, and the complex figure by .9, (in order to give a higher emphasis on the complex changes) and the two products are added together to create a weighted coefficient of overall change observed for each subject group. Finally, a ranking is given to each group between 1 and 6 based on the weighted level of changes per hour.

Average Simple Changes per session:

Number of overall L2 & L3 summarized changes that occurred divided by the number of sessions of education which gave a coefficient which can standardize the ratio across the six organizations.

Weighted Changes per session:

A compilation of the simple and complex session changes to create an overall change ratio per subject that is weighted more heavily towards complex changes but includes simple ones as well. The desired effect was to display internal and transformational change actions as compared to simpler acts of going through motions.

This figure is derived by taking the total number of L2 – L3 as a coefficient based on the changes found per hour coupled with the L4-L6 coefficient derived in the same manner. The simple change coefficient is multiplied by .1, and the complex figure by .9, (in order to give a higher emphasis on the complex changes) and the two products are added together to create a weighted coefficient of overall change observed for each subject group.

Friction points per hour:

Ratio combining number of (F) per 60 minutes of session time. This figure is derived by dividing (F) by the number of hours of education to create a comparable coefficient between the six organizations that is normalized by the amount of education that was given regardless of the duration of the study period.

Friction points per visit:

Ratio combining number of (F) per session.

Detrimental acts by management per hour:

Ratio combining number of (D) per compiled education hour.

Detrimental acts by management per visit:

Ratio combining number of (D) per session.

Subject Surveys

Within the 6 observed organizations, there were a total of 56 individuals interspersed. From that group, 21 key members were surveyed to record various demographic, perception ranking and written responses about their organizational environments. This data was used for the

grounded theory analysis, which compared surveyed perceptions with observed realities, to help test various factors of organizational change for possible correlations. Survey data was collected via Google forms survey format which uses an emailed link to a web-based survey form. Survey responses were recorded automatically on the Google spreadsheet cloud-based servers.

Surveys totaled 46 questions. Breakdowns of the question classifications were as follows:

Demographics	3 questions
Prose writing responses	3 questions
Organizational measurement (1 - 10 rankings)	6 questions
Levels of trust (1 - 10)	4 questions
Management facilitation of change (1 - 10)	4 questions
Levels of rules at work (1 - 10)	3 questions
Other miscellaneous & self assessment questions (1 - 10)	23 questions

Responses to all 1 - 10 ranking questions were grouped by organization and mean averaged to create a single average for each. Questions were then grouped into the various categories listed above and further averaged as needed in order to display a single ranked average for each category for each of the six groups represented.

Chapter 8

HYPOTHESIS TESTING

In an effort to answer the fundamental research question of the relationship between education, measurement and change, several sub-questions have been created which probe the central query from diverse angles which will help to create a definable and convincing response. These hypothetically-queried tests are conducted by application of observed subject actions, correlation analysis, grounded theory analysis, graphical summaries and combined variations of the above. By answering such questions and additionally including observed interactions of the subjects that align themselves with the tests, the author will endeavor to weave a tapestry of iterations that can be summarized in conclusive form. Research Question: What are indicators and measurements of success and failure in management initiatives when education and measurement are applied as fundamental drivers of change?

As a part of the analysis of the question, this research addresses the issue with varied methods of supporting validation including summaries of time involved in specific activities, correlations between various possible factors in organizational change, summary tables of observed levels and other statistical analysis that helps to demonstrate such indicators. These methods are shown in the 16 hypothesis questions being tested as shown below.

- ***HED 1: Initiatives that involve Education of advanced organizational measurement positively correlate with measured organizational change***

In order to more fully view this test it is important to review the scaled levels of change that were outlined in the methodology section. Of the six levels, a compilation five of them have been included in this section to verify the changes that were observed based on the initiative objectives. These results are posted below in table 6.

Observed Change Levels	**CBS**	**PHX**	**FE**	**OR**	**AMK**	**SRP**	**Totals**
L1 Perspective	NA	NA	NA	NA	NA	NA	
L2 Behavior Introduction	40	10	10	0	2	16	**78**
L3 Applied Process Sequencing	56	7	2	4	4	14	**87**
L4 Distributive Transformational	44	0	8	2	5	0	**59**
L5 Proactive Application	3	0	0	1	3	0	**7**
L6 Transferred Application	5	0	3	12	2	0	**22**
Total Session Changes Observed	**148**	**17**	**23**	**20**	**16**	**30**	**254**

Table 6: Total observed levels of change in education sessions

As is displayed, there were a total of 254 observed sessions where noted events and interactions of the meetings fit into the classified framework of the research effort. These events counted as progressive levels of change where the teams within each group were able to achieve such levels of change. It should be noted that because of the difficulty of Perspective changes being observed, (Level 1 changes), such summaries were not included in this listing. The types of change varied along the spectrum of levels where the most heavily found in the lower Behavior Introduction and Applied Process Sequencing levels and more sparsely found in the higher Proactive Application and Transferred Application areas. Regardless of the disbursement of levels of observed change, it is the authors intention to first, outline that such levels do exist through real-time observational method, and second, draw some level of conclusion of organizational change based off of analysis of such observations as they relate to existing research and theory.

- ***HED 2: Education of advanced organizational performance measurement techniques cause reduced formal transactions between the supervisory and subordinate parties.***

This hypothesis was originally postulated from the observations of the research team, its verification was difficult to validate until a framework and measurement were incorporated to be able to capture a

situation which would demonstrate such an event. Two of the six subjects, AMK and CBS, were utilized as means of analyzing the reduction effects.

In the case of AMK it was observed that the weekly risk report sessions had become effective enough at addressing and mitigating risks to the contractual project that both the subordinate party (AMK) and the supervisory party (ASU) requested that the sessions be held bi-weekly for a period of about one month. Following that period, it was requested by both parties that the meetings be held to an on-call basis. Although the research team did not want to condone such a break from the schedule, it was agreed upon to eliminate the sessions from the schedule due to a lack of regularly appearing risks which typically plague such relationships.

The education sessions had occurred for approximately 3 years before this observation had begun and continued for a year during this study before the change was made to an on-call basis. Initial sessions during the three year period lasted substantially longer than the 15-minute average that was recorded in the duration of the study. Over the 4.5 year record, the sessions decreased from well over 15 minutes per week to an average of 15 minutes down to virtually no minutes.

In the case of CBS and their contractual relationship with ASU, similar weekly risk report education sessions were held as well. These meetings were also attended and facilitated by the research members with

the added measurement of the actual minute figure compilations over the period of a year and 6 months as shown in the graph in Figure 12.

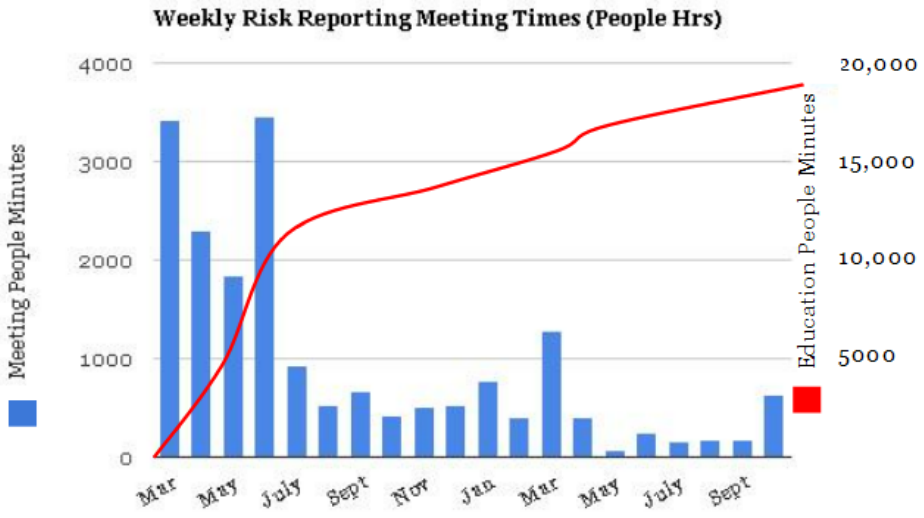


Figure 12: The Reduction of Weekly Risk Report Session Minutes Compared to Education Between Canon Business Solutions and their Client

During the first four months of the observation, the sessions were directed at addressing risks that may arise during the contract period. This period shows high levels of man-hours invested reaching well over 3000 minutes for the months of March and June. Following this period, the man-hour's drop down substantially during the next 10 months as the contract revision was signed into effect in July of the first year. By May of the second year, the average monthly man-hours dropped well below an average of 500 minutes per month which equates to less than one-sixth of what the initial four months required. From this perspective, it is clearly

shown that the drop in time needed for the sessions is both gradual over the period and substantial from start to finish.

Correlation Analysis Preface

While integrating the study of human behavior with statistical analysis, the creation of sufficient statically data is typically the most challenging task at hand. Simply finding enough data sets or value's of n, (the number of data sets, subjects, or other applicable elements), is a constant challenge of the behaviorist researcher because each set tends to be a result of specific interactions between human beings which is difficult to automate or accelerate.

Additionally, when the analysis of human behavior has a source in specific observed interaction of individuals, and not the more traditional survey data which is perception-based, the accumulation of interpretable data becomes increasingly more difficult to obtain because of the real-time observation that is required to observe record, interpret, compile and finally, analyze in a statistical setting.

For this reason, the introduction of the correlation analysis of this research is prefaced with the understanding that, in some cases, the n values tested will be as low as 6 subjects who will statistically render the p values as well as the resulting degrees of freedom to be well outside what is considered statically acceptable in traditional analysis. However, due to the foundational nature of such studies, the higher p value correlations

should be considered as a framework for analyzing future types of studies where higher levels of subject material data can be gathered.

Correlation Analysis

In an effort to better understand and analyze organizational links and their relationships with the varied levels of change, a test of various correlates was conducted which tested multiple dimensions of the process. These comparisons yielded what is classified as low (.3 or lower) medium (between .3 and .7) and high (between .71 and .99). Further examination of the relationships is outlined in the hypothesis topics below.

TIME OF EDUCATION AND OC

Initially, a comparison of overall hours of education time was tested with the overall weighted coefficient of change for each subject. This test yielded a correlation of .47 which indicated a positive relationship. A p value of .17 resulted which does not give a high level of confidence that the r value correlation did not occur by chance. This is displayed in Figure 13. From this result, a further test was developed to attempt to distinguish between simpler change actions and more complex ones.

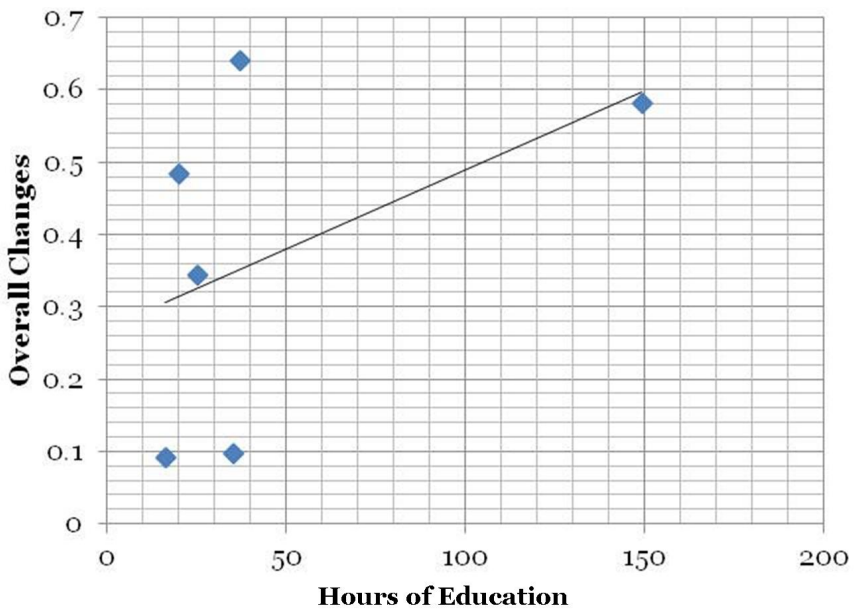


Figure 13: Education Time vs. Overall Changes

Compilations of the hours of session time were kept for each of the six groups. These were paired against two groups of change as they were recorded. The first group views the simpler levels including all L2 and L3 incidents, the Behavior introduction and Applied Process Sequencing acts of change. The hypothesis statement is listed below:

- ***HTOC 1: More time of education of advanced organizational measurement correlates with higher levels of simple OC (L2 – L3).***
- ***H0: There is no correlation between advanced organizational measurement and higher levels of simple OC.***

The coefficients yielded from the observations of such levels of change produced a correlation of .41 when paired with the minutes of

education meeting time that were recorded and a p value of .21 which does not give a high level of confidence that the r value correlation did not occur by chance. Results of this test are shown in Figure 14.

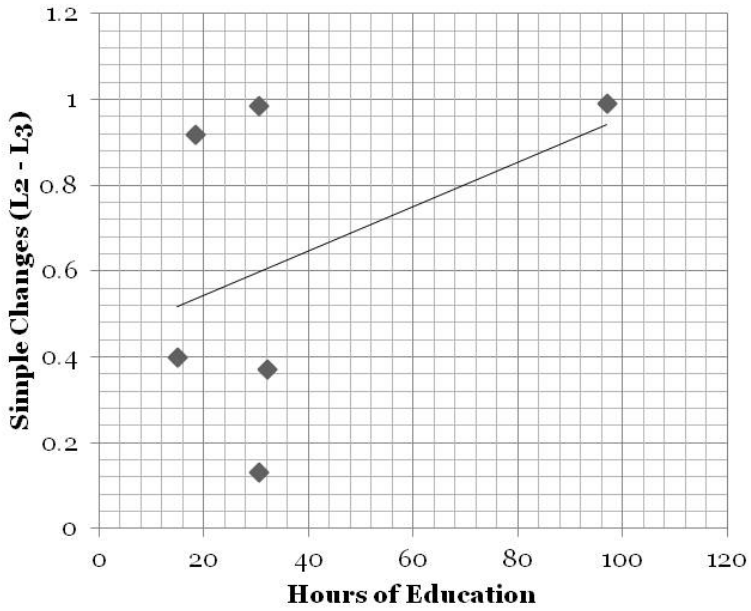


Figure 14: Education Time vs. Simple Change

Coefficients of the complex changes were derived by summarizing the total number of sessions given where higher and more complex levels of change were observed, divided by the total number of hours of education given.

- ***HTOC 1: More time of education of advanced organizational measurement correlates with higher levels of complex OC (L4 – L6).***
- ***H0: There is no correlation between advanced organizational measurement and higher levels of complex OC.***

These figures, including all Levels 4 through 6 totaled, were compared with the amount of time of education a low-level correlation of .28 was found with a p value of .2989 which does not give a high level of confidence that the r value correlation did not occur by chance. This is shown in figure 15. This comparative view helps to distinguish the time-based levels of behavior modification to have a greater effect on the more simple areas of change.

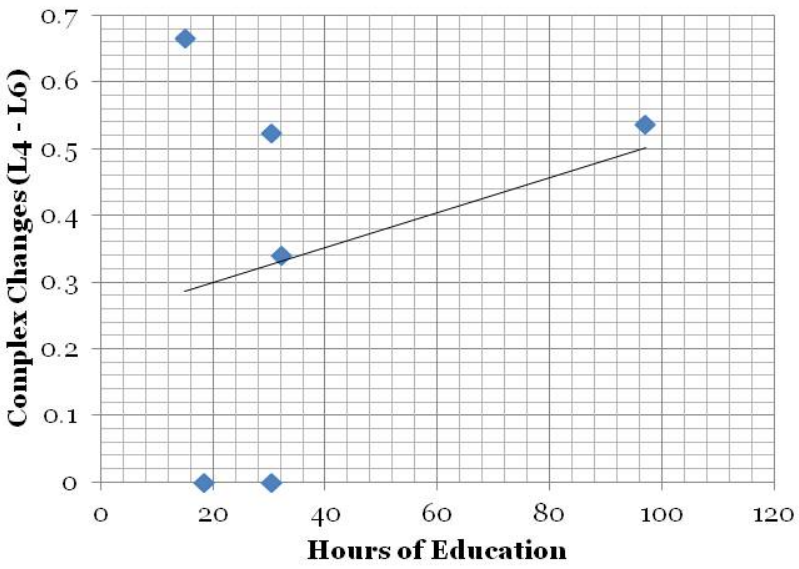


Figure 15: Education Time vs. Complex Change

FRICTION POINTS

- ***HF 1: Frictional points correlate to higher levels of collaborative change***
- ***Ho: There is no correlation between friction points and higher levels of collaborative change***

Friction points were a second area that was analyzed as compared to behavior modification. These points, as outlined earlier in the data collection section, were summarized as a per-session basis and compiled to create a ratio of friction points per hour of education time coefficient. This particular analysis broke down the comparison with two facets of change, the first being the collaborative change and the other an overall ratio. As frictional points related to collaborative changes, a mid-level correlation of .66 was yielded with a resulting p value of .076 which does not give a high level of confidence that the r value correlation did not occur by chance. A display of such results is shown in figure 16. However, when the friction measurements were applied to the overall change coefficient, a high-level positive correlation of .98 was found with a p value of .00026 which does give a high level of confidence that the r value correlation did not occur by chance and the null can be rejected under traditional statistical analysis. A hypothesis of such a test is listed below and a display of this is shown on figure 16.

- ***HF 2: Frictional points correlate to higher levels of general OC***
- ***Ho: There is no correlation between frictional points and higher levels of general OC***

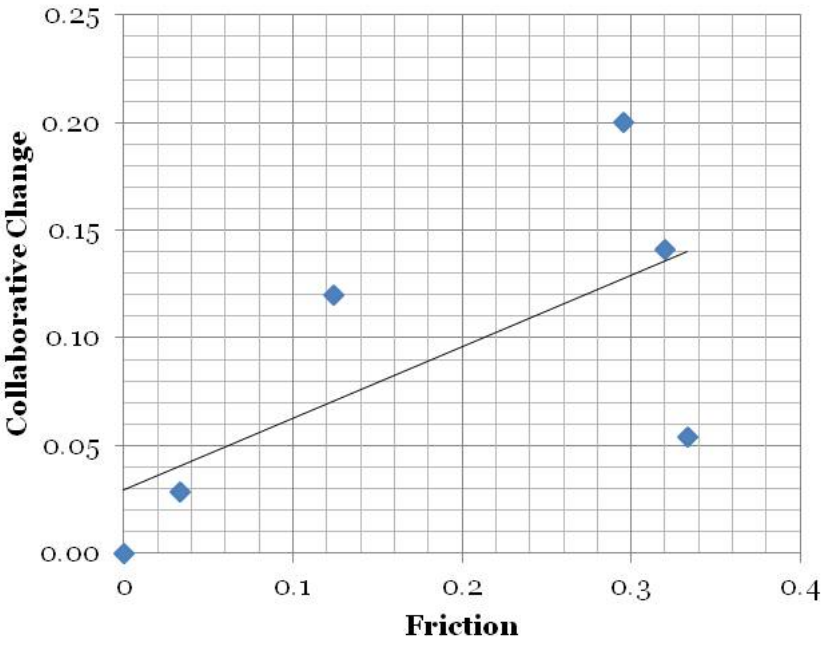


Figure 16: Friction Points vs. Colaborative Change

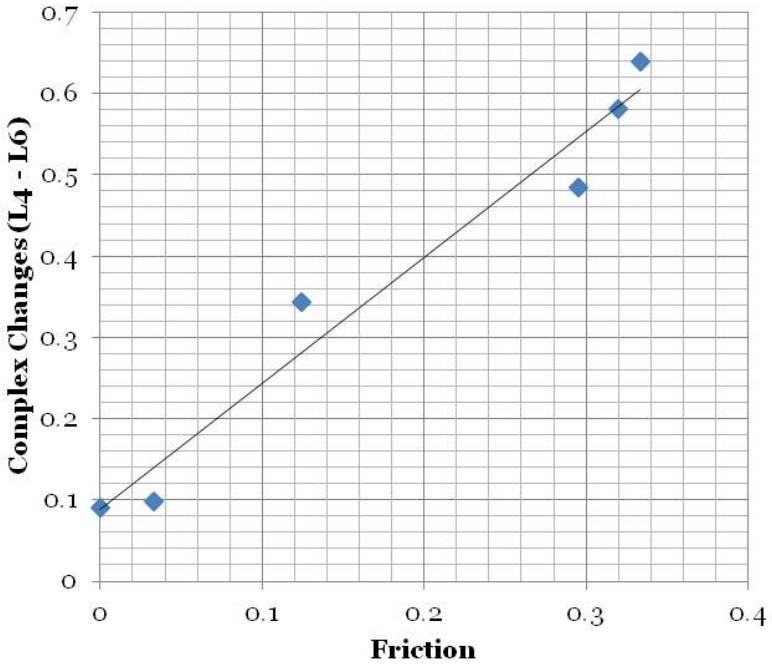


Figure 17: Friction Points vs. Complex Change

A third friction test series was run to illustrate a relationship with time that was invested by the subjects in education on measurement. The metric of time that was used was the number of sessions held with each subject group compared to the levels of friction that occurred with the group. It is an effort to establish a possible link between friction, organizational change and levels of education.

- ***HF 3: Higher levels of friction points correlate with higher levels of hours and number of sessions.***

- ***Ho: There is no correlation between higher friction points and higher levels of hours and numbers of sessions.***

With six graphical points given an r value of .48 were yielded which equates to a medium-level correlation and a p value of .167 was generated which does not give a high level of confidence that the r value correlation did not occur by chance. A graphical view of the test is shown in figure 18.

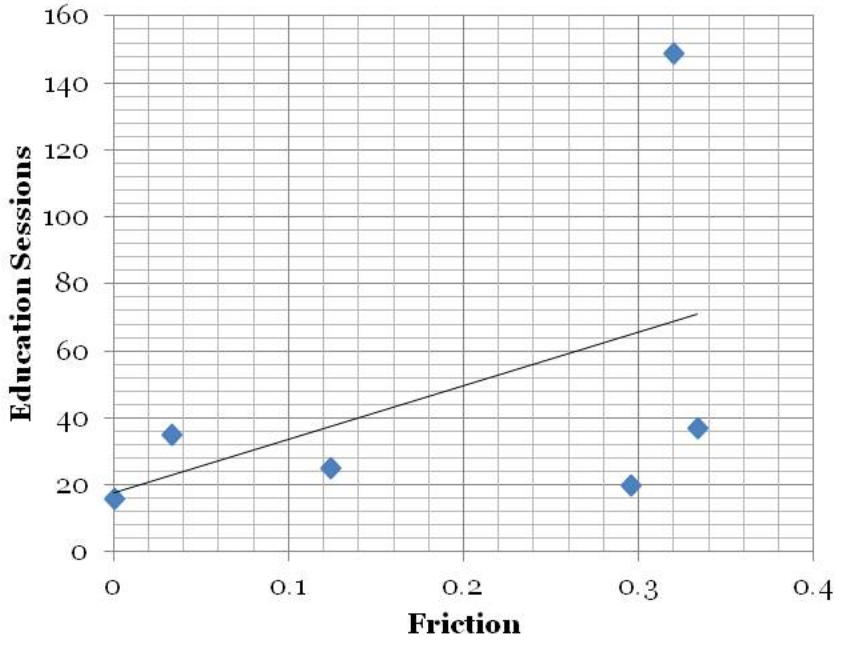


Figure 18: Friction Points vs. Education Sessions

The evidence of rules, both written and unwritten, was paired with different levels of change to find any correlations in their occurrences. A first test was run to correspond with the subject's ability to make simple

changes with higher levels of rules, micromanagement and overall general control from management.

- ***HRU 1: Lower levels of organizational rules correlate with higher simple OC.***
- ***Ho: There is no correlation between lower levels of organizational rules and higher simple OC.***

Using a grounded theory comparison, 18 coordinates were derived from the survey summaries paired with the L2 - L3 level responses, an r value of .205 was yielded along with a p value of .21 which displayed a low level correlation of these two comparables but does not give a high level of confidence that the r value correlation did not occur by chance.

A second test relating rules and the more complex levels of change, including L4-L6, resulted in an extremely low r value of .0508367 with a p value of .42 which does not give a high level of confidence that the r value correlation did not occur by chance.

- ***HRU 2: Lower levels of organizational rules correlate with higher Complex OC.***
- ***Ho: There is no correlation between lower levels of organizational rules and higher Complex OC.***

Results of both rules tests are shown in figure 19 and 20 respectively.

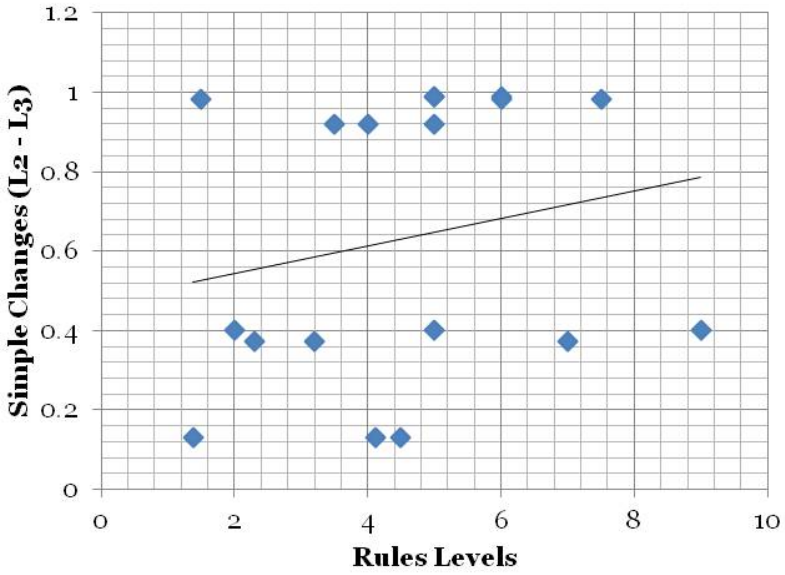


Figure 19: Rules Levels vs. Simple Changes

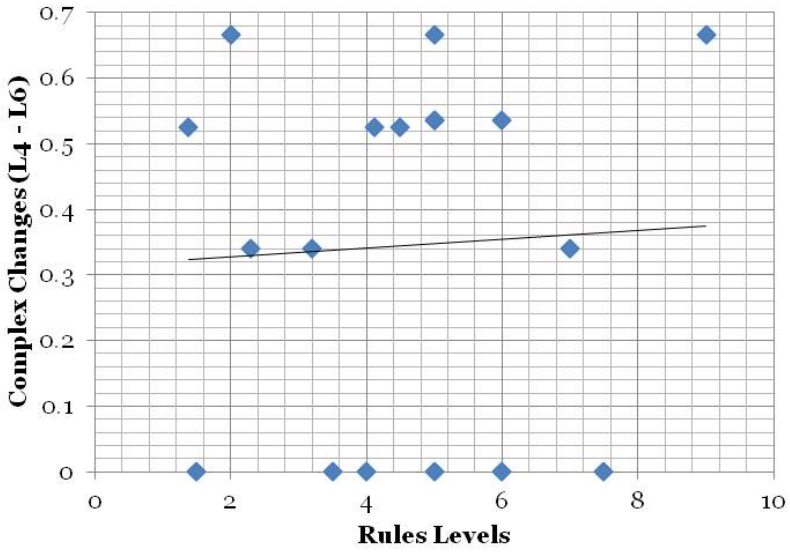


Figure 20: Rules Levels vs. Complex Changes

A grounded theory approach was also applied to find correlations between perceived support of changes by management and actual changes made within the subject groups.

- ***HCC1: Complex change is greater where supervising parties are viewed to be supportive in the change initiative.***
- ***Ho: There is no correlation between complex change and viewed support of supervising parties in the change initiative.***

Specifically, the author wanted to analyze the complex changes that took place to verify if the more proactive changes, L4 – L6, would occur. A single test was run comparing the support perception with the actual observed complex changes. From this comparative data, 6 data coordinates resulted where r = .180089 and a p value of .003 which does give a high level of confidence that the r value correlation did not occur by chance. Therefore the null hypothesis can be rejected giving support to the correlation. This indicates a low-level correlation between management support and complex changes observed. A graphical display of the results is found on Figure 21.

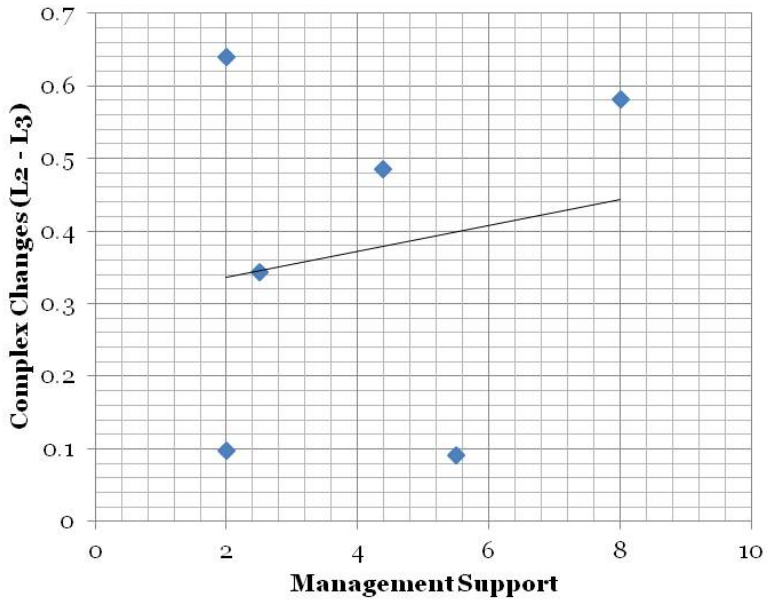


Figure 21: Manegerial Support of OC vs. Complex Change

TRUST

Grounded theory was also applied in the correlative test of change vs. trust in the subject groups. A first test was run comparing surveyed trust levels and simple changes.

- ***HCT 1: Greater levels of overall OC correlate with higher organizational perceived trust.***
- ***Ho: There is no correlation between overall OC and higher organizational perceived trust.***

This yielded a very minute correlation due to an r value of .001778 and a p of .4967 which does not give a high level of confidence that the r

value correlation did not occur by chance. A second test was run comparing the same trust levels with the higher and more complex levels of change (L4 - L6).

- ***HCT 2: Greater levels of complex OC correlate with higher organizational perceived trust.***
- ***Ho: There is no correlation between complex OC and higher organizational perceived trust.***

An r value of .1445747099 resulted with a p value of .250 which does not give a high level of confidence that the r value correlation did not occur by chance. Results of the complex change correlation are shown in Figure 22.

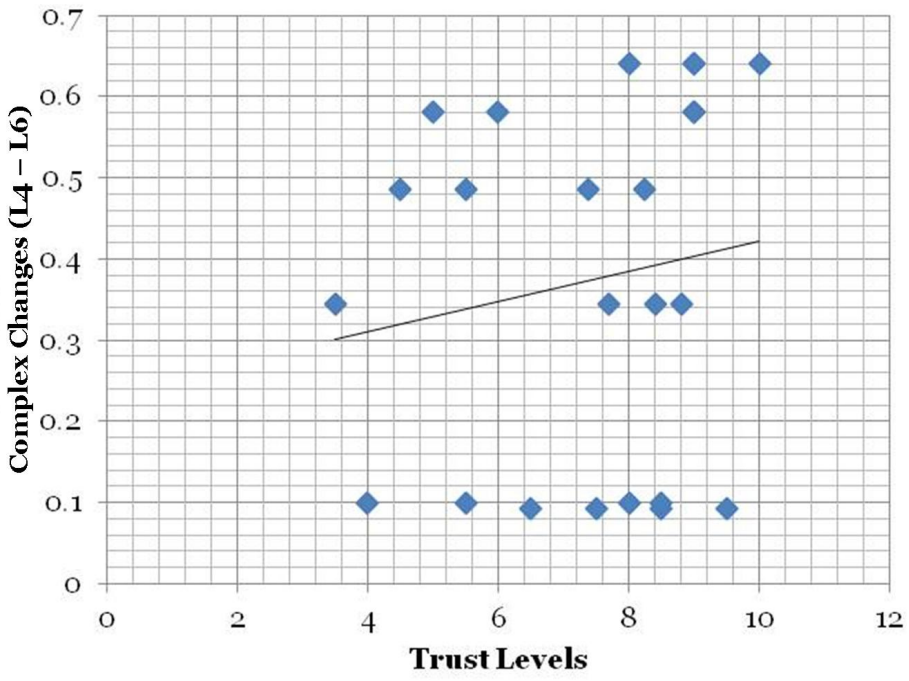


Figure 22: Perceived Trust vs. Complex Changes

In analyzing the two previous tests, it is notable that there is evidence of trust as being a greater factor on higher levels of observable change as compared to lower levels.

PREEXISTING MEASUREMENT

A final grounded theory approach to data analysis was formulated with a comparison of overall organizational change and the evidence of previous measurement within organizations.

- ***HPM 1: Higher levels of OC correlate with a higher perception of preexisting measurement within an organization***
- ***Ho: There is no correlation between higher general OC and a higher perception of preexisting measurement within an organization.***

Such a test supplied 36 data coordinates between the two fields where a medium-level correlation was yielded where r = .45 with a p value of .0029 was generated which does give a high level of confidence that the r value correlation did not occur by chance. Therefore the null can be rejected and a correlation between OC and a higher perception of preexisting measurement is supported. Results of the test are found in Figure 23.

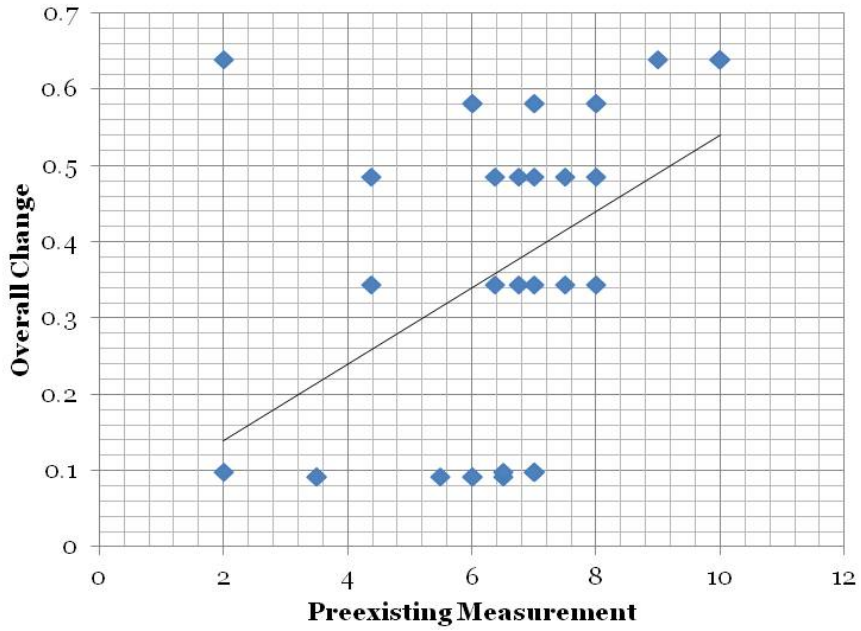


Figure 23: Preexisting Measurement vs. Overall Change

FRICTION AND PROMOTIONS

Another analysis was carried out where each individual member among the various group that received promotions as defined in the study was comparatively analyzed according to the number of friction points that they were involved with.

- ***HRE 1: Education of advanced organizational performance measurement techniques cause greater Visibility through friction of a measured high performer which leads to their promotion (Pu or Pd)***

A graphical display in Figure 24 shows the eight members (PU 1 - PU 8) who received upward promotions during the period of observational study and show that in each case, there was a small-to-significant number of what is termed as facilitating contributors to friction (F1). In the cases of PU 1, PU 2 and PU 7, the individuals also participated in some resister-type friction but the existence of such friction is not consistent across the group. This graphical display helps to demonstrate that individual promotion may be iteratively linked to being on the F1 side of the friction dichotomy.

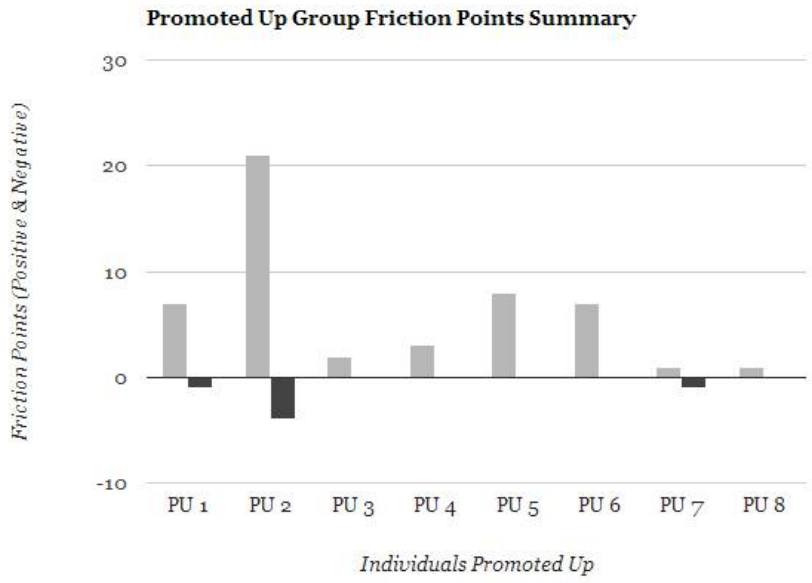


Figure 24: Promoted Individuals with Positive Friction

A similar, yet inverse comparison was made with the individuals who experienced a definable negative promotion, or demotion, in their responsibilities.

- ***HRE 2: Education of advanced organizational performance measurement techniques cause greater Visibility of measured under-performers which leads to realignment or demotion (Pu or Pd)***

In this study, six individuals fell into this classification. Of the six individuals, as shown in Figure 25, a notably high number of resistor-level friction (F2) events were observed in each case.

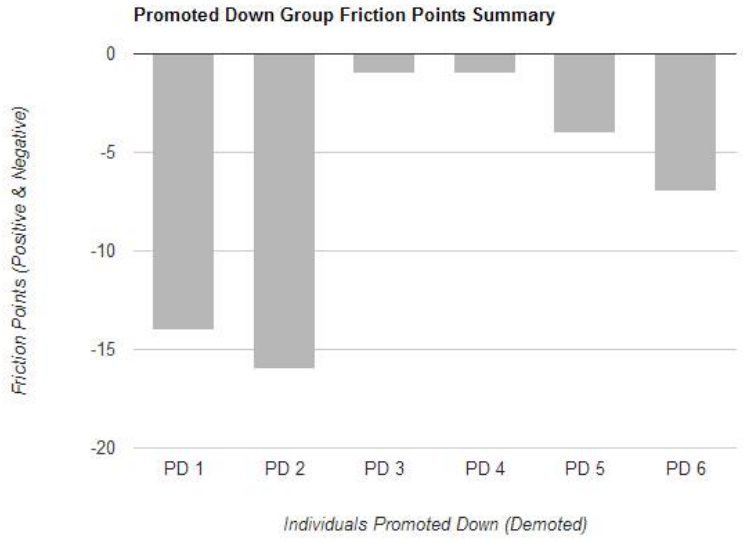


Figure 25: Demoted Individuals with Negative Friction

A final statistical test was conducted to help support the visual findings from the above two tests of promotions up and down. In order to do such an analysis, a Chi Square test of independence was chosen between the 57 individuals that were observed in total to see if any relationship existed statistically between their association in positive and negative friction and

their ability to be promoted or demoted based on their association with friction on both the positive and negative sides. The hypothesis for such a test is listed below.

- ***HRE 3: Upward or downward promotion is related to positive or negative friction among the observed members.***
- ***Ho: No relationship exists between friction and promotion***

The Chi-Square test generated a value of .001290904 with a p value that was less than 0.05. Therefore, the null premise of independence is rejected and a relationship appears to exist between upward promotion and positive friction as well as downward promotion and negative friction. It should also be noted that the use of a Chi-Square test is deemed more appropriate when each of the expected cells is greater than 5.

To further examine relationships between members involved in friction and their tendency towards promotion or demotion, a chi-square test was initiated. A null hypothesis (Ho) was created stating that there was no relationship between friction and promotion. An Ha was created which stated an upward or downward shift in promotion was related to positive or negative friction. A p-value was set at <0.05. From this test, a chi-square value yielded a value of .001290904. Results of the test rejected the premise of independence which demonstrates a statistical

relationship between friction point members and vertical movement in organizations.

As a disclaimer, the use of a chi-square test is deemed more appropriate when each of the expected cells is less than or equal to 5.

- ***PMT 1: Higher levels of change are apparent when there are perceived higher levels of Past Measurement Efforts.***

A final analysis of the subjects is formulated at the high-level perspective of comparing and contrasting the top and bottom two changing organizations with their notable strengths in compiled data. Such data included a comprehensive review of 31 measured criteria areas of the subjects throughout the observations which were accounted, compiled and, in most cases, standardized sufficiently to carry out a comparative analysis.

In this review of the criteria compared with the rankings of the high and low subjects, there were two notable points that showed distinction between high changing groups and the lower ones. The first differentiating factor came from the survey results which asked the specific question "I feel that I am measured accurately in my workplace". The intent of the question was to query the subject's perception of how well their organization was measuring their employees previous to the initiative. On a scale between 1 and 10 where 10 is the highest level of

effective measurement, the top two subjects averaged a 9. However, this figure is contrasted with a 5.25 average ranking that is found with the lowest changing two groups.

Though less distinct, other survey results also identified a lower perceived ranking of planning and measurement in the organizations that had greater difficulty in changes. The average 1 - 10 rank that this group gave to overall work environment measurement effectiveness was 5.65 whereas the higher performing change subjects rated their organizations with an average of 7.75.

These differences of 3.75 and 2.1 points can be considered substantial because of the role that measurement plays in the model being proposed in this research.

The second area of notable focus on this comprehensive analysis comes from the area of complex changes where the levels of change that included Applied Process Sequencing (L4), Distributive Transformation (L5), and Proactive Application (L6). In both subjects that had a low change ranking, they had comparable levels of the L1 and L2 types of changes with the other subject groups. However, there were no observed activities involving the higher and more complex levels of change while all other subjects had at least some percentage of such actions. Looking more specifically within the L4 - L6 levels, it is found that the highest ranked changing subjects also averaged a 22% occurrence of L4 changes per education session whereas, as shown earlier, the lowest subjects had a 0%.

It is, therefore, possible to state that the occurrence of L4 incidents may be possible factor in obtaining higher levels of change during the initiative.

Chapter 9

VALIDATION OF DATA AND DISCUSSION

This chapter summarizes the study intent and findings with a discussion and summary of the result. The research proposed in this document has a few major characteristics worth noting in this section. Because of the foundational intent of this study, it is anticipated that the summary of evidence in this section can be woven together in a bridge of understanding that helps to answer fundamental questions about organizational change and its relationship with environmental factors as well as induced elements. The application of education and measurement as drivers of such change along with the perspective of real-time observations of change give the study a unique perspective to document change as it unfolds in regular increments. The study also gives an opportunity to present a scaling of such observed acts of change for further analysis across various subjects as well as longitudinal tracking.

Problems that were addressed in the field of study were initiated by a high turnover rate of clientele that enjoyed the benefits of improved project management processes but struggled to implement a full-scale system of measurement via education which would help them achieve such goals. This search into initiative-based change management studies led to a further understanding of the current limitations of change model research where both real-time data and standardized measurement were shown to be wanting in practice. An integral link between organizational

change studies and education was introduced through the growing understanding and acceptance of organizational change and learning being equal in observation. However, such evidence of such events in empirical practice tends to be difficult to quantify, leaving the "perspective transformation" of individuals as a destination point of such scholarly work (Taylor 1997).

The objectives of the study were to cross disciplines of change management, education practices, project management in the built environment and the use of measurement in a single approach to better understand how to make proactive changes in organizations last. Deliverables of such research are fivefold. First, it consisted of a series of six case study tests among six separate organizations that were initiated at the beginning of the observation period (and not historically gathered as is the case of traditional literature of change management). Secondly, the results of a change model test where the data produced was derived from real-time ontological observation of the evidences of their occurrences. Thirdly, a scaled sequence of change levels and other relevant data was developed and applied in order to quantify both simple and complex acts of change that occur beyond "transformational learning". Fourth, survey results of the tested subjects which provided perception of their environments as they relate to areas such as trust, measurement, change management, etc. The fifth and final deliverable is the analysis of the various forms of collected data which was used to answer the hypothesis

question of the indicators and measurements of success and failure in management initiatives when education of advanced measurement is applied as a driver of change.

Findings & Discussion

From the 16 questions that were developed as subcategory hypothesis, eleven correlation tests were run along with one chi-square test to show strength in relationships of the existing data. Additionally, four graphical summaries and one criteria analysis were utilized to summarize the findings. Additionally, over 65 pages of meeting minute data written in an 8 point font were also accounted for in that the general progressive story of the subject organizations were told as well.

Change Verified

Of primary importance in this study is the validation of factual change that did take place based on the models intent initiating organizational change based on the initiative. Not only were there 254 recorded sessions where changes in behavior occurred in the subject teams, but a stratified scale of the levels of changes was observed, documented and compiled for further analysis. Other areas of change were clearly defined in the time measurements of the risk report meetings of the two subject groups that were in the contract management stage of the initiative. While normal meeting minutes would either be ascending or random in their sequence length, the case of the Canon Business

Solutions and Aramark meetings both having a shrinking time total over the months indicates an identifiable and quantitative pattern.

Friction – HF 1, HF 2 & HF 3

Within the confines of the existence of recorded changes is the second key notable relationship between friction and change. As was statistically demonstrated, the relationship between the two elements was also verified in a case by case observation. Occasional meetings between team members that were involved with the initiative were tense and uncomfortable due to team members who either supported the initiative or opposed it. However, it was discovered in the observed cases that the friction, so long as it was within a defined boundary, tended to be a healthy means to bring members on the "same page" with what was lacking as well as putting silent pressure on those that were not in alignment with the desired changes. In several cases of recording meetings, the existence of friction became a predictor of more changes to come around the corner or the alignment of an individual or two away from the group based on who was following the initiative and who was opposing it.

Further relationships between friction and observed organizational change were drawn with collaborative change as well as with the number of sessions received. Specifically, it entails the formal resolution of such friction as well as the endurance of the learning process while friction is actively created for the intent of change. Such a relationship indicates a group's willingness to not only work out formal differences in performance

but to also endure more and more education sessions and overcome the required changes in paradigm and habit.

Time - HTOC 1 & HTOC 2

Though it seems logical to assume that greater levels of change may occur when more time is spent, via minutes or sessions, the validation of such a conjecture is helpful to clarify some of the nuances of how and what types of change occur over time. The three tests run comparing time and change all showed that changes are linked to the number of minutes of education. Yet, it was the types of change that showed some distinction which is worth noting. Simpler levels, which included the single-act and sequence-act levels of changes, were less affected by time compared to the more complex and proactive applications of the initiatives being applied. This may account to the belief that a the momentum of change, as displayed in more complex behavior and active spreading of new processes and paradigms simply takes more time to gain speed. Whereas simpler changes can be initiated quicker but may not last over longer durations because of a lack of momentum.

Transparency and Vertical Movement - HRE 1, HRE 2, HPMT 1

Though shown both graphically and statistically that there is a relationship between observed members experiencing lateral movement from their participation in friction points, an applied explanation of this can be made with the process that was introduced in Figure 7 (education to measurement model). As education and measurement are applied as

model components to an organizational environment, the productivity and alignment of individuals become clearer due to the measured aspect of the model. Thus, by becoming more clearly measured, greater accountability is allocated to individuals because of the implemented performance measurements. From that interaction, supervising members are able to more clearly see the performance of members and make strategic decisions based off of the more easily assessed environment.

Empirical iterations of such events were clear surprising clear cut and easy to see as the author attended the hundreds of meetings that were observed. With Aramark, there was a clear deficiency in how the client representative was handling a major risk to the contracted agreement which would inevitably cost the client several million dollars. This friction point was clearly stated through the model measurement tool at each weekly meeting over the period of several months. Consequently, after many proactive efforts were made by the Aramark representative to help mitigate the problem, both the Aramark and ASU key members were promoted and demoted respectively within the same month of each other. The high performing Aramark individual went on to oversee a larger 9-conference center regional account and the ASU representative was reassigned to a substantially lower-dollar area of administration.

In the case of Fann Environmental, the individual that was championing the internal initiative for his workplace had gone through many frustrating friction points with his co workers. His efforts to

implement the simplified measurement processes were met by great resistance and pushback internally. Interestingly, that individual had managed a construction project with one of the company's clients that was very impressed with his ability to not only perform his management duties, but also more clearly measure his performance alongside the performance of those that were related to the project. From that encounter with the client, a job was offered to the Fann Environmental project manager to oversee both the facilities of the client as well as run their financial management process; a responsibility over more employees and assets then his previous employment. He accepted the position and was able to apply further measurement practices in his new line of work.

A third case of promotion took place with the digital documenting services contract between Canon Business Solutions and ASU. With the model of education and measurement in place, it became apparent that two of the CBS team members had functions that were not contributing to, and even detracting from, the purpose of the contract because of some of the changes that were made in the most recent amendment between the two organizations. Again, for several months, the CBS group experienced internal friction and frustration because of the misalignment of the two members with the metrics-based agenda. However, due to the repeated reporting and frictional relationship, an upper management decision was finally made to relocate one of the two conflicting members to a smaller region and simplify the other member's responsibility to a smaller scope.

A third CBS employee who was more consistently on the positive side of the friction events was given greater responsibility over the project as well.

Rules - HRU 1

Attempts to find relationships with the level of rules within subject groups and recorded changes found small levels of evidence in the area of simple changes and virtually no connection with the higher complexities. It is likely that this illustrates two possible sides of a spectrum of understanding the relationship of rules and change. First, it could mean that there really is little-to-no relationship between the two. Secondly, it could also illustrates the possible need to try a different or more sophisticated approach to defining and measuring the term of "no rules" in organizations. In the literature review, the author demonstrates that although the concept is not a new one, finding a scholarly methodology to study its existence is in its relative infancy and has much to establish before effective qualitative data can be generated for study.

Trust and Managerial Support – CC 1 & CT 1

The areas of trust and managerial support are paired in this discussion due to their close relationship. This is stemmed from the assumption that true trust in organizations comes from management setting and supporting the environment where individuals feel comfortable trying new things and taking some risks regarding changes. While the analysis of trust and managerial support are well cited as they relate to organizational change it is interesting to note that only a small

relationship was found in the grounded theory tests. Though significant in its existence, it was one of the smaller links that were found of the varied tests. This helps to underscore the possibility that although the two areas are considered as factors in change, they may not be the most influential of possible drivers of change.

Pre Existing Measurement - PM 1

Figuring in the existence of previous measurement efforts is a new concept that was originated from this study. It was based two assumptions that are closely linked. First, creating a measured environment may take long increments of time to adapt to. Secondly, when members of an organization are already accustomed to being measured, it is easier to adapt to higher and more sophisticated levels of measurement as in the initiative that was tested. Therefore, a mid-level relationship between changes made and previous measurement of individuals is considered substantial because it helps to demonstrate that the more that a group has been measured in the past, the better it can adapt to initiatives that are given. This is also considered useful to the study because of the internal relationship that measurement has with the applied model components of education and measurement.

Limitations to the Study

A tempered perspective must be maintained in examining the findings and discussion of this research owing to the theoretically-based framework that this work rests upon. Being based in human behavioral

theory, it should be noted that all observations and quantitative figures have a qualitative base which separates the data and findings from what might be a more traditional engineering standard of measurement.

Additionally, the real-time nature of the data collection gives it a more candid, and lives nature which does not allow for rehearsals or retests in the observation of human interaction. Though powerfully raw in its makeup, the actions and events that were recorded can be disputed as not having been controlled enough to be considered conducive.

Crossing disciplines with research is also an area worth considering as a potential limiting risk where principals and concepts may be considered similar in nature but very different in definition and applied practice. An example of this is clearly illustrated in how engineering research defines qualitative data compared to human behavioral disciplines. It took the author several months to realize that one school of thought defines qualitative as being precisely equal to what the other school defines as quantitative.

A final limitation of the study is given in the number of observed subjects that were detailed. In making several of the correlation tests, it would be considered more optimal and statistically robust to provide additional subjects in order to provide higher probability values as greater number of subject tests (n) were available.

Recommendations for Future Research

Due to the foundational nature of this research, it is recommended that further applications of change observations be made in order to broaden the number of subject data to be applied to the various tests that were conducted. This continuance would allow for heightened understanding on the nature and strength of the correlations.

It would also be beneficial if further use and expansion of the scaled levels of change could be created in order to better understand higher levels of change as well as how they relate over time of the observed changes. This observational recording would require the continued use of the inaugural model application points in order to maintain the raw and unfiltered responses of individuals as initiatives are induced and changes recorded.

All of these recommendations are intended to help play a part in giving this research pattern further expansion and links to more longitudinal studies in organizational change. This work is meant to be a bridge point between internal "perception changes" and the full fledged process and group-level paradigm shifts that are known to take place organizationally.

Chapter 10

CONCLUSION

This research document has made an attempt at creating a greater understanding of the vast and complex nature of organizational change as it relates to the work of project managers. Its specific proposed contributions have been three-fold. First, it includes the creation and testing of a change management model that utilizes Education and Measurement as key drivers of such changes in organized initiatives. Second, an organized method of observation of change in real-time is where the intent is defined before the observation and the deliverables are recorded as they occur, in real-time, compared to the traditional historical methods that have been outlined. Thirdly, a scaled metric for gauging varied levels of change is both introduced and utilized as a rubric for empirical analysis of both observed and surveyed behavioral change data among six subject organizations that were trying to implement a specific and common initiative of applying more sophisticated measurement system internally in order to optimize performance.

Results of such a study included the answering of 16 hypothetical questions on what it is that either facilitates or drives change in organizations amongst supervising and subordinate parties. A summary of the test results recurring indicators is listed below in the following five points:

1. Education on more sophisticated measurement techniques does drive desirable and intended change.
2. Greater levels of such education contribute to greater change achieved.
3. The presence of friction between supervising and subordinate parties within the implementation of an initiative is an integral part of successful change.
4. The presence of preexisting performance measurement systems in organizations is the strongest indicator, and therefore predictor, of future organizational change ability in organizations.
5. Increased performance measurement in organizations leads to the promotion of higher performing individuals and the demotion of lower performing individuals.

Summarizing this research effort as a whole, it can be validated that increased education on organizational performance measurement leads to increased organizational learning, change and overall efficiency. Though such a statement may be intuitive and easily accepted by proponents of organizational behavior, its scientific verification allows for a stronger foundation to be laid in the understanding of both project and change management.

Chapter 11

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